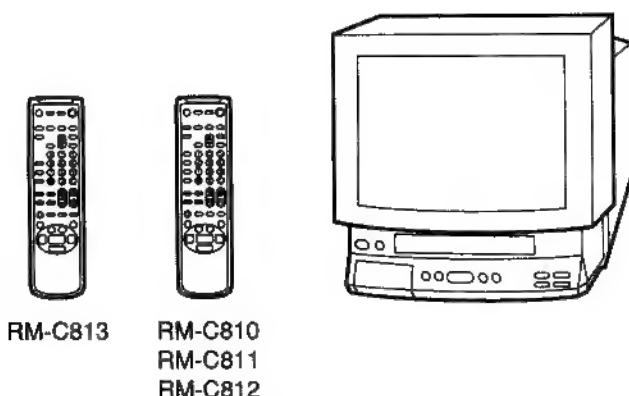


# SERVICE MANUAL

**BC-4 CHASSIS**

MODEL	COMMANDER	DEST.	CHASSIS NO.	MODEL	COMMANDER	DEST.	CHASSIS NO.
KV-21V5A	RM-C810	Italian	SCC-N40D-A	KV-21V6A	RM-C810	Italian	SCC-N40B-A
KV-21V5B	RM-C812	French	SCC-N42D-A	KV-21V6B	RM-C812	French	SCC-N42B-A
KV-21V5D	RM-C810	AEP	SCC-N39D-A	KV-21V6D	RM-C810	AEP	SCC-N39B-A
KV-21V5E	RM-C810	Spanish	SCC-N41D-A	KV-21V6E	RM-C810	Spanish	SCC-N41B-A
KV-21V5K	RM-C813	OIRT	SCC-N32C-A	KV-21V6U	RM-C811	UK	SCC-N43B-A
KV-21V5U	RM-C811	UK	SCC-N43D-A				

Refer to the SERVICE MANUAL of VHS MECHANICAL  
ADJUSTMENT IV for MECHANICAL ADJUSTMENT.  
(Part No. 9-973-623-11)



**TRINITRON® COLOR VIDEO TV**  
**SONY®**

※ Please file according to model size. ■ ■

## SPECIFICATIONS

### TV Section

Television system	B/G,L
Color system	PAL,SECAM
	NTSC3.58/NTSC4.43(VIDEO input only)
Channel coverage	See "Receivable channels and channels display" below.
Picture tube	Hi Black Trinitron
Aerial in	75-ohm aerial socket for VHF/UHF

### Video Section

Format	VHS standard
Video recording system	Rotary 2-head helical scanning system
Audio recording system	Monaural
Video signal	PAL/SECAM
Tape speed	PAL/SECAM
	SP : 23.39mm/sec.
	LP : 11.70mm/sec. (PAL only)
	NTSC
	SP : 33.35mm/sec.
	LP : 11.12mm/sec.
Maximum recording time	SP : 4 hours with E-240
	LP : 8 hours with E-240

### Inputs and Outputs

Inputs	LINE IN VIDEO:phono jack (1) 1 Vp-p, 75 ohms, unbalanced, sync negative
	LINE IN AUDIO:phono jack (1) Input level:500 mVrms (100% modulation)
Output	EURO-AV : 21-pin
Head Phone Jack	EURO-AV : 21-pin Monaural minijack

### General

Clock	Quartz locked
Clock back up	Approx. 7days
Power requirements	220-240 V AC, 50Hz

### Power consumption

KV-21V5A,D,E,K,U	: 97W
KV-21V6A,D,E,U	: 103W
KV-21V5B/21V6B	: 81W

### Operating temperature

5°C to 40°C(41°F to 104°F)

### Storage temperature

-20°C to 60°C(-4°F to 140°F)

### Dimensions

526 x 518 x 476 mm (w/h/d)  
(20<sup>3</sup>/<sub>4</sub> x 20<sup>1</sup>/<sub>2</sub> x 18<sup>3</sup>/<sub>4</sub> inches)

### Mass

24kg (30 lb 14 oz.)

### Accessories supplied

Remote Control (1)  
R6 (size AA) batteries (2)  
Aerial (1)

Design and specifications are subject to change without notice.

### Note

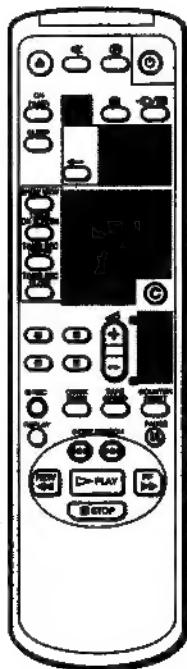
This appliance conforms with the EU Directive 89/336/EE3 regarding interference suppression.

### Receivable channels and channel displays

TV System Band	B/G	L(B)	I(U)	D/K(K)
Low VHF band	E2-E4	F2-F4	—	R1-R5
High VHF band	E5-E12	F5-F10	—	R6-R12
UHF	E21-E69	F21-F69	B21-B69	R21-R69
CATV	S01-S05	B-Q	—	S01-S05
	S1-S41	S21-S44	—	S1-S41

The operation instruction mentioned here are partial abstracts from the Operating Instruction Manual. The page numbers of the Operating Instruction Manual remain as in the manual. (Part No : 3-860-137-11)

## Step 3 — Tuning in to TV Stations



You can preset up to 80 TV channels, either automatically or manually. The automatic method is easier if you want to preset all receivable channels at once. Use the manual method if you want to allocate programme numbers to the channels one by one.

### Before you begin

- Depress the  $\odot$  (MAIN POWER) switch, located behind the cover on the front of the video TV, to turn the TV on.
- If the  $\odot$  lamp on the video TV is lit in red (indicating that the video TV is in standby mode), press  $\square$ , PROGR +/- or a number button on the remote control.

### Selecting the menu language

You can select one of several languages for the menu and on-screen information.

The initial setting is English.

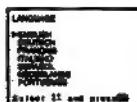
- Press MENU.

The main menu appears.



- Move the cursor ( $\gg$ ) to "LANGUAGE" with  $+\downarrow$  or  $-\downarrow$  and press OK.

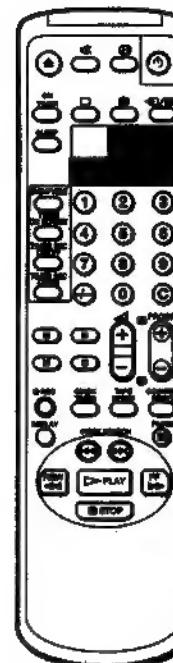
The LANGUAGE menu appears.



- Select the language you want with  $+\downarrow$  or  $-\downarrow$  and press OK.

The selected language is coloured green, and the menu appears in the selected language.

- Press MENU to return to the original screen.



To stop automatic channel presetting  
Press  $\square$  on the remote control.

### Presetting channels automatically

- Press MENU to display the main menu.

- Move the cursor ( $\gg$ ) to "PROGRAMME PRESET" with  $+\downarrow$  or  $-\downarrow$  and press OK.

The PROGRAMME PRESET menu appears.



- Move the cursor ( $\gg$ ) to "AUTO PROGRAMME" with  $+\downarrow$  or  $-\downarrow$  and press OK.

The AUTO PROGRAMME menu appears.

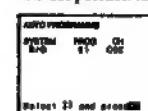


- Press OK.

The programme number you previously watched appears in red in the "PROG" position.

Using  $+\downarrow$  or  $-\downarrow$ , select the programme number from which you want to start presetting and press OK. You cannot begin presetting at 00.

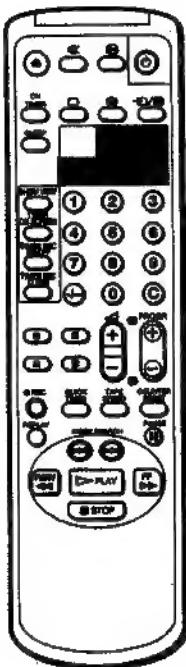
The CH position turns red.



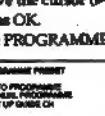
- Select the channel with  $+\downarrow$  or  $-\downarrow$  and press OK.

The video TV starts scanning and presetting all receivable channels from the programme number selected in step 4.

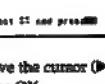
The preset programme and channel numbers are displayed on the screen in sequence. When presetting is finished, the original screen reappears. All available channels are now stored on successive number buttons.



### **Presetting channels manually**

- 1 Press  **MENU** to display the main menu.
- 2 Move the cursor (**>**) to "PROGRAMME PRESET" with **+ ↑** or **- ↓** and press **OK**.  
The **PROGRAMME PRESET** menu appears.  


PROGRAMME PRESET  
AUTO PROGRAMME  
MANUAL PROGRAMME  
SET UP GUIDE CH

Select 2 and press OK
- 3 Move the cursor (**>**) to "MANUAL PROGRAMME" with **+ ↑** or **- ↓** and press **OK**.  
The **MANUAL PROGRAMME** menu appears.  


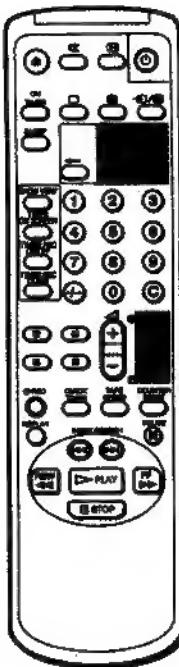
MANUAL PROGRAMME  
PROG 011 021 031 041 051 061 071 081 091  
012 022 032 042 052 062 072 082 092  
013 023 033 043 053 063 073 083 093

Select 22 and press OK
- 4 Using **+ ↑** or **- ↓**, move the cursor (**>**) to the programme position (number button) to which you want to press the channel, and press **OK**.  
The **PROG** position button is used.

For progressive questions  
beyond 6  
The display scrolls by pressing ← or → sequentially.

If you have made a mistake  
Press  $\leftarrow$  to return to the previous  
position.

- 5 Select the system with  $+ \circ$  or  $- \circ$  and press OK.  
The CH position turns red.
- 6 Select the channel you want to preset with  $+ \circ$  or  $- \circ$  and press OK.
- 7 The video TV starts scanning receivable channels. When the channel is found, it stops. If you want to preset this channel, press OK. If not, press  $+ \circ$  or  $- \circ$  to search for another channel.
- 8 Repeat steps 4 through 7 to preset other channels.
- 9 After you finish presetting, press MENU to return to the original screen.



## **Skipping programme positions**

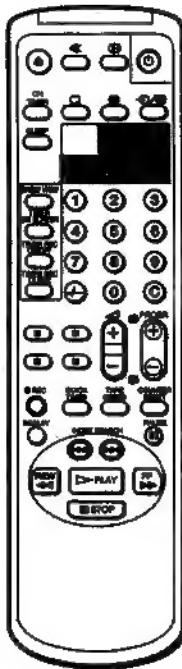
You can skip unused programme positions when selecting programmes with PROGR +/- buttons.

- 1 Press MENU to display the main menu.
- 2 Move the cursor (▶) to "PROGRAMME PRESET" with + ⏴ or - ⏵ and press OK.  
The PROGRAMME PRESET menu appears.
- 3 Move the cursor (▶) to "MANUAL PROGRAMME" with + ⏴ or - ⏵ and press OK.  
The MANUAL PROGRAMME menu appears.
- 4 Using + ⏴ or - ⏵, move the cursor (▶) to the programme position which you want to skip and press OK.  
The "SYS" position turns red.

For progressive positions  
Interval 6  
The display scrolls by pressing - or  
repeatedly.

When you select programmes using the PROGR +/- buttons, the programme position is skipped.

- 6 Repeat steps 4 and 5 to skip other programme positions.
- 7 Press MENU to return to the original screen.

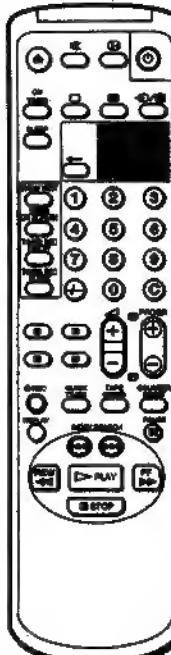


## Captioning a TV station name

You can name a channel using up to five characters (letters or numbers) to be displayed on the TV screen (e.g. MTV). Using this function, you can easily identify which channel you are watching.

- 1 Press MENU to display the main menu.
- 2 Move the cursor (▶) to "PROGRAMME PRESET" with + ♂ or - ♂ and press OK.  
The PROGRAMME PRESET menu appears.
- 3 Move the cursor (▶) to "MANUAL PROGRAMME" with + ♂ or - ♂ and press OK.  
The MANUAL PROGRAMME menu appears.
- 4 Using + ♂ or - ♂, move the cursor (▶) to the programme position you want to caption and press OK repeatedly until the first element of the "LABEL" position turns red.
- 5 Select a letter or number with + ♂ or - ♂ and press OK.  
The next element turns red. Select other characters in the same way. For the element you want to leave blank, select "-" and press OK.
- 6 After selecting all the characters, press OK repeatedly until the cursor appears. Now the caption you chose is stored.
- 7 Repeat steps 4 through 6 to caption other channels.
- 8 Press MENU to return to the original screen.

If you have made a mistake  
Press ♂ to return to the previous position.



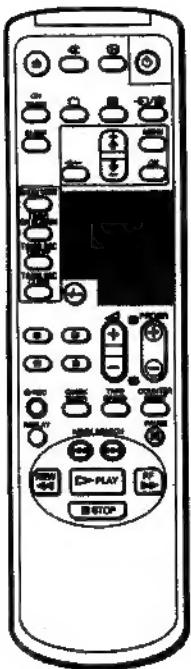
## Manual fine-tuning

Normally, the automatic fine-tuning (AFT) is already working. However, if the picture of a programme is distorted, you can use the manual fine-tuning function to obtain better picture reception.

GB

To reactivate automatic fine-tuning (AFT)  
Repeat from the beginning and select "ON" in step 5.

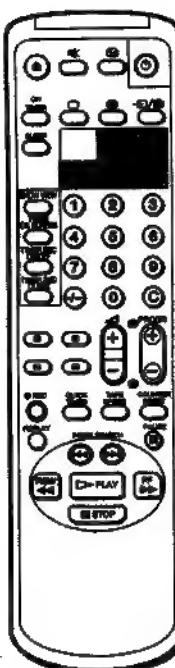
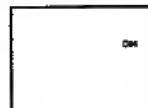
- 1 Press MENU to display the main menu.
- 2 Move the cursor (▶) to "PROGRAMME PRESET" with + ♂ or - ♂ and press OK.  
The PROGRAMME PRESET menu appears.
- 3 Move the cursor (▶) to "MANUAL PROGRAMME" with + ♂ or - ♂ and press OK.  
The MANUAL PROGRAMME menu appears.
- 4 Using + ♂ or - ♂, move the cursor (▶) to the programme position which you want to manually fine-tune, and press OK repeatedly until the AFT position turns red.
- 5 Fine-tune the channel while holding down + ♂ or - ♂ so that you get the best TV reception. As you press these buttons, the frequency changes from -15 to +15.
- 6 After fine-tuning, press OK.  
The cursor (▶) appears. The fine-tuned level is now stored.
- 7 Repeat steps 4 through 6 to fine-tune other channels.
- 8 Press MENU to return to the original screen.



## Tuning in to a channel temporarily

You can tune in to a channel temporarily, even when the channel has not been preset.

- 1 Press C on the remote control.  
To tune in to a cable channel, press C twice. The indication "C" (for VHF/UHF channels), or "S" (for cable channels) will appear on the screen.
- 2 Enter the double digit channel number using the remote control number buttons (e.g. for channel 4, press 0, then 4).  
The channel will appear. However, this channel will not be stored in the video TV's memory.



## Setting a Pay-TV channel (KV-21V6D only)

You can watch Pay-TV channels by connecting a Pay-TV decoder to the G-1/-G 1 connector on the rear of the video TV.

- 1 Press MENU to display the main menu.
- 2 Move the cursor (▶) to "PROGRAMME PRESET" with + ⏹ or - ⏹ and press OK.  
The PROGRAMME PRESET menu appears.
- 3 Move the cursor (▶) to "MANUAL PROGRAMME" with + ⏹ or - ⏹ and press OK.  
The MANUAL PROGRAMME menu appears.
- 4 Move the cursor (▶) to the programme position to which you want to set the pay-TV decoder, and press OK until the D position turns red.



- 5 Press + ⏹ or - ⏹ until ⏹ appears in the D position and press OK.



- 6 Press MENU to return to the original screen.

### Note

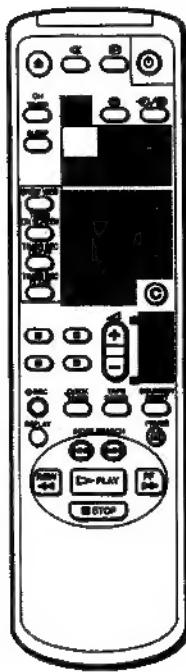
While you are recording a program which is being recorded through the Pay-TV decoder, you will not be able to view other programmes through the decoder.

### Note (KV-21V6D only)

In order to record a programme received through a Pay-TV decoder, you must preset the channel according to the method on page 6 "Protecting channels manually", or page 13 "Setting a pay-TV channel," and then tune in to the channel according to the method on page 12 "Selecting TV programmes".

## Step 4 — Setting up ShowView Manually

— 8 —



The ShowView function allows you to simplify the task of programming your video TV to make timer recordings. You should coordinate the programme position of each channel with the guide channel (the number that's assigned to each TV station in advance). To find the guide channel numbers, look in the programme guide for your area that features ShowView numbers.

### Before you begin

- If the  lamp on the video TV is lit in red (indicating that the video TV is in standby mode), press , PROGR +/- or a number button on the remote control.

### Setting the guide channels

- 1 Press MENU to display the main menu.

The main menu appears.



- 2 Move the cursor () to "PROGRAMME PRESET" with + or - and press OK.

The PROGRAMME PRESET menu appears.

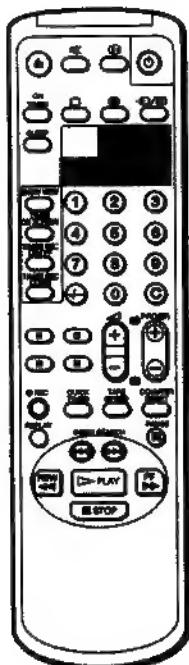


- 3 Move the cursor () to "SET UP GUIDE CH" with + or - and press OK.

The SET UP GUIDE CH menu appears.



## Step 5 — Setting the Clock



You need to set the clock in order to use timer recording and quick-timer recording functions.

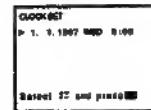
- 1 Press MENU to display the main menu.



- 2 Move the cursor (▶) to "CLOCK SET" with + or - and press OK. The CLOCK SET menu appears.



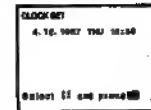
- 3 Press OK to start setting the clock. The day section turns red.



- 4 Set the day with + or - and press OK. The month section turns red.



- 5 Using + or - and OK, set the month, year, hour and minute in the same way as in step 4.



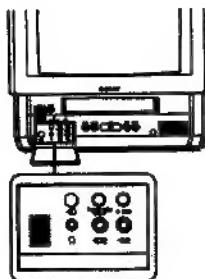
- 6 After setting the minute, press OK. The clock starts working.

- 7 Press MENU to return to the original screen.

If you have made a mistake  
Press ← to return to the previous  
screen.

If the clock has stopped and  
"—:" is displayed  
You have to re-set the clock.

## Watching the TV



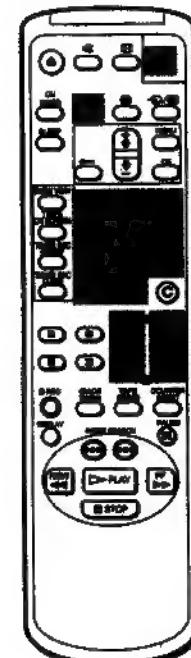
This section explains the basic functions you use while watching the TV. Most of the operations can be done using the remote control.

### Switching the video TV on and off

GR

#### Switching on

Depress the (MAIN POWER) switch, which is located behind the cover on the front of the video TV. Press C, PROGR +/- or number buttons on the remote control, or PROGR +/- on the video TV when the ( ) lamp is lit in red (indicating that the video TV is in standby mode).



#### Switching off temporarily

Press ( ). The video TV enters standby mode and the ( ) lamp on the front of the video TV lights up in red.

#### To switch on again

Press C, PROGR +/- or number buttons on the remote control, or PROGR +/- on the video TV.

**To switch off the main power**  
Press the ( ) switch on the video TV.

### Selecting TV programmes

Press PROGR +/- or number buttons on the remote control, or PROGR +/- on the video TV.

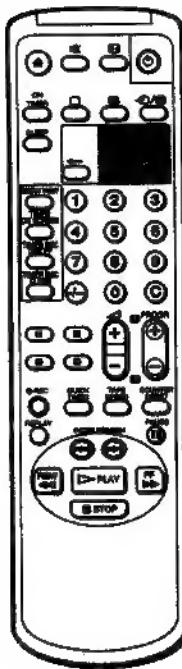
#### To select a double-digit number using the number buttons

Press ←, then the numbers.  
For example, if you want to choose 16, press ←, 1 and 6.

**Note**  
When the ( ) switch is turned off, the video operations do not work.

### Adjusting the volume

Press ← +/→.



**Note**  
The HUE adjustment is available only for the NTSC colour system.

## Adjusting the picture

1 Press MENU to display the main menu.



2 Move the cursor (▶) to "PICTURE CONTROL" with + or - and press OK.

The PICTURE CONTROL menu appears.



3 Using + or -, select the item you want to adjust and press OK.

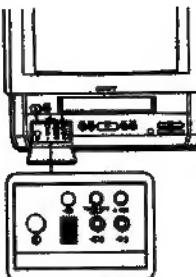
4 Adjust the picture with + or - and press OK.  
With each press the vertical bars increase or decrease and the figure at the right margin changes to show the control level. (See the table below.)

5 Repeat steps 3 and 4 to adjust other items.

6 Press MENU to return to the original screen.  
The adjusted control levels are stored.

### Effect of each control

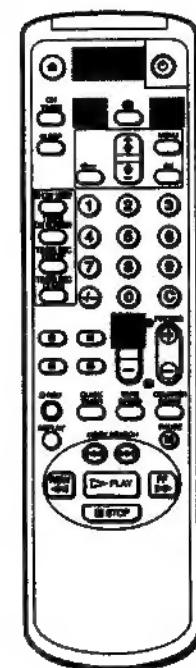
PICTURE CONTROL	Effect
CONTRAST	Less  More
COLOUR	Less  More
BRIGHTNESS	Darker  Brighter
HUE	Greenish  Reddish
SHARPNESS	Softer  Sharper
RESET	Resets all the items to the factory preset levels.



## Muting the sound

Press .

The indicator appears and stays on the screen.  
To resume normal sound, press again or .



## Displaying the on-screen information

Press to display the following on-screen information.  
To have the programme number, channel number and caption stay on the screen, press again.  
To make the indications disappear, press until no indications are displayed on the screen.



Current date and time

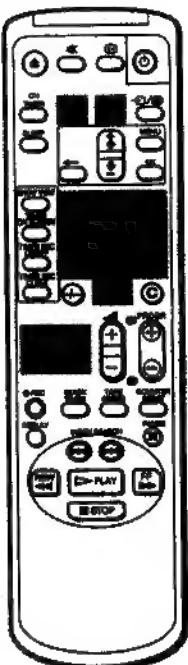
## Watching line input

Press repeatedly until the desired input indicator appears.  
To return to the normal TV picture, press until the programme position appears or press on the remote control once. For details of the video input picture, see page 42.

## Listening with headphones

Plug the headphones (not supplied) into the (headphones) jack which is located behind the cover on the front of the video TV.  
The sound from the speaker is turned off.

## Viewing Teletext



TV stations broadcast an information service called Teletext via the TV channels. The Teletext service allows you to receive various information, such as weather forecasts or news, at any time.

### Switching Teletext on and off

- 1 Select the TV channel which carries the Teletext service you want to watch.
- 2 Press  to display Teletext. A Teletext page (normally the index page) is displayed. If there is no Teletext broadcast, the indication P100 is displayed on a black screen.
- 3 Press the number buttons to enter the three digits of the Teletext number you want. The numbers are displayed on the screen and the requested page appears in a few seconds. If you have made a mistake, type in any three digits, then re-enter the correct page number.
- 4 Press  to return to the TV mode.

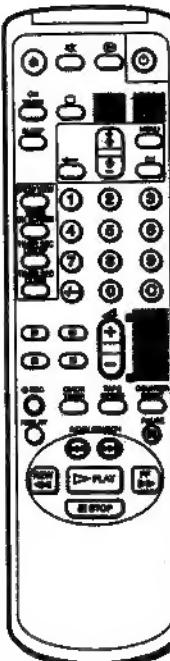
### Using Fasttext

This feature allows you to access a Teletext page by pressing only one button. When a Fasttext page is broadcast, a colour-coded menu appears at the bottom of the screen. The colours of the menu correspond to the red, green, yellow and blue buttons on the remote control. These coloured buttons function as the Fasttext buttons in Teletext mode.

Press the coloured button which corresponds to the colour-coded menu. The page is displayed after a few seconds.

To change the Teletext channel

- First press  to return to the TV mode, then repeat steps 1 through 3.
- If the signal of a TV channel is weak, Teletext errors may occur.



### Accessing the next or preceding page

Press PROGR +/-/.

The next or preceding page appears on the screen.

### Superimposing a Teletext page on the TV picture

Each time you press , the screen changes as follows:

→ Teletext → Teletext and TV

### Preventing a Teletext page from being updated or changed

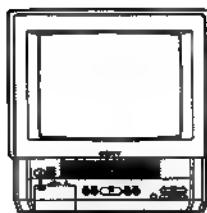
A Teletext page may consist of several subpages. You can stop the page scrolling in order to read the text at your own pace.

Press  (HOLD).

The symbol  appears on the screen and the selected subpage is held.

Press  again to return to normal Teletext operation.

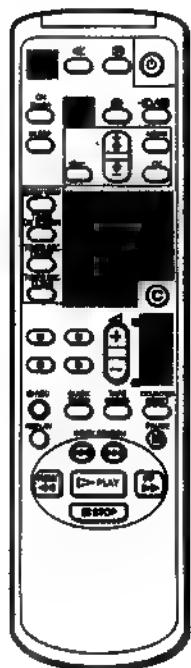
# Playing a Tape



This section shows you how to insert a video cassette and to play it. More convenient functions you can use while playing a tape are described in "Additional Operations" on page 36.

## Inserting a video cassette

- 1 Press C, PROGR +/- or number buttons on the remote control, or PROGR +/- on the video TV when the  $\odot$  lamp is lit in red (indicating that the video TV is in standby mode).
- 2 Gently insert a cassette with the arrow indication facing upwards. The cassette is automatically loaded into the cassette compartment. The  $\odot$  indicator appears on the screen and stays until the cassette has been loaded. The video TV turns on automatically when it is in standby mode. If you insert a cassette with its safety tab removed, playback starts.

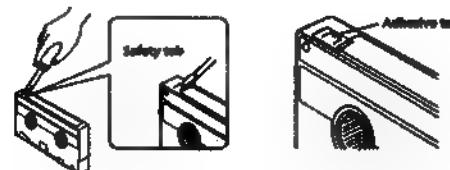


## Ejecting a video cassette

Press EJECT  $\Delta$  on the video TV or  $\Delta$  on the remote control. The  $\odot$  indicator appears and stays until the cassette is ejected. You can eject the cassette even if the power is in standby.

## Protecting your cassette against accidental erasure

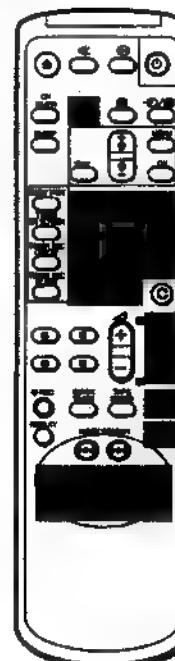
The cassette is provided with a safety tab to protect against accidentally erasing a previous recording. Break off the safety tab with a screw driver or a similar tool to prevent recording. If the safety tab is removed, the cassette is ejected when you try to record on it. To record on a cassette with the safety tab broken off, simply cover the tab hole with adhesive tape.



## Playing a tape

- 1 If the  $\odot$  lamp on the video TV is lit in red (indicating that the video TV is in standby mode), press C, PROGR +/- or a number button on the remote control.
- 2 Insert the tape. If you insert a tape with the safety tab removed, playback begins immediately.
- 3 Press PLAY  $\triangleright$ . Playback begins. On-screen information will automatically disappear after several seconds.

GB



### To stop playback

Press STOP  $\blacksquare$ . The video TV returns to the normal TV picture.

### To stop playback for a moment

Press PAUSE  $\square$ . The picture pauses. Press PAUSE  $\square$  again or press PLAY  $\triangleright$  to resume playback. If you leave your video TV in pause mode, normal playback resumes after about 5 minutes.

### To fast forward the tape

Press STOP  $\blacksquare$ , then press FF  $\triangleright\triangleright$ .

### To rewind the tape

Press STOP  $\blacksquare$ , then press REW  $\triangleleft\triangleleft$ .

### To search a tape at high speed

During playback, press and hold REW  $\triangleleft\triangleleft$  (rewind) or FF  $\triangleright\triangleright$  (fast forward). A high-speed picture appears on the TV screen. To resume normal playback, release the button.

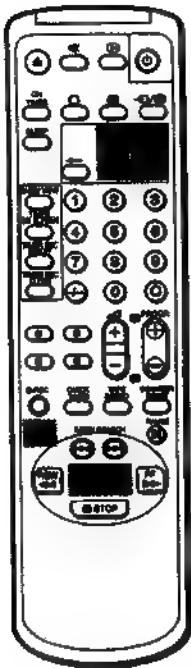
### To view the picture in fast forward or rewind mode

Press and hold FF  $\triangleright\triangleright$  during fast forward or REW  $\triangleleft\triangleleft$  during rewind. While you hold the button, you can view the picture.

When you release the button, fast forward or rewind mode is resumed.

## Resetting the tape counter

The tape counter helps you to locate a certain scene after playback. Press COUNTER RESET on the remote control to set the counter to "0:00:00" before playing the tape. The tape counter is automatically reset to "0:00:00" whenever a cassette is inserted. The video TV keeps counting the length of the tape being played. Note, however, that the tape counter does not count the portions without video signals recorded.



## Playing a tape repeatedly (AUTO REPEAT)

You can play the recorded portion of a tape repeatedly.

- 1 Press MENU.  
The main menu appears.
- 2 Using the + or - buttons, move the cursor (>) to "VCR MODE," then press OK.  

- 3 Using the + or - buttons, move the cursor (>) to "AUTO REPEAT," then press OK.
- 4 Using the + or - buttons, select ON.  

- 5 Press PLAY ▶.  
Playback begins. When the tape reaches its end, it will automatically rewind and begin playing again.

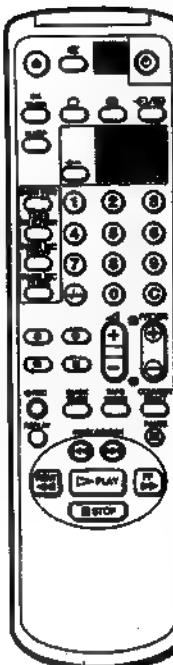
## Replaying a scene automatically

You can use the REPLAY key on your remote control to automatically replay scenes.

Press REPLAY.

The tape will rewind for ten seconds of viewing time and then begin playing automatically.

If you wish to replay more than ten seconds, press REPLAY repeatedly. Each time you press the button, it will add ten seconds onto the playing time, up to a total of 40 seconds.



## Setting the colour system

Normally, you will want to leave the colour system on AUTO. However, if you notice streaks appearing on the screen during playback, you may want to set the colour system to the system that the tape was recorded in.

- 1 Press MENU.  
The main menu appears.
- 2 Using the + or - buttons, move the cursor (>) to "VCR MODE," then press OK.  

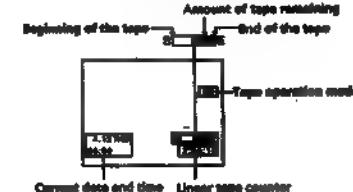
- 3 Using the + or - buttons, move the cursor (>) to "COL SYS," then press OK.
- 4 Press the + or - buttons until the corresponding colour system appears (PAL or NTSC), then press OK.  

- 5 Press MENU to return to the original screen.

## Displaying the on-screen indications

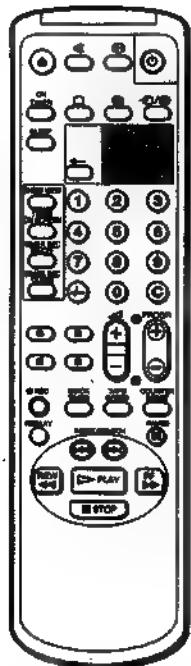
Press **DISP** to display the following on-screen information. To show only the amount of tape remaining and linear tape counter on the screen, press **DISP** again.

To make the indications disappear, press **DISP** until no indications appear.



## Recording TV Programmes

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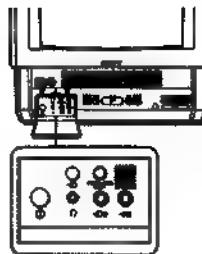
### Viewing programmes in 16:9 mode

When viewing recordings of programmes which were originally broadcast in 16:9 mode, you will want to set your video TV to 16:9 mode to prevent a distorted picture.

- 1 Press MENU.  
The main menu appears.
- 2 Using the + or - buttons, move the cursor (>) to "VCR MODE," then press OK.
- 3 Using the + or - buttons, move the cursor (>) to "FORMAT," then press OK.
- 4 Press the + or - buttons, select 16:9, then press OK.
- 5 Press MENU to return to the original screen.

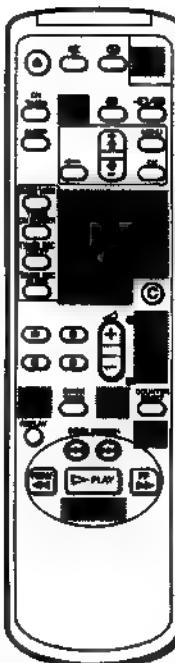
#### Note

When you change channels, switch between input sources, or turn the power on and off, the video TV will switch back to normal mode.



### Recording TV programmes

- 1 Press C, PROGR +/- or number buttons on the remote control, or PROGR +/- on the video TV when the C lamp is lit in red (indicating that the video TV is in standby mode).
- 2 Insert a cassette with a safety tab.
- 3 Press TAPE SPEED to select the recording speed, SP (Standard Play), or LP (Long Play). Recording in LP mode will extend the length of your tape.  
Maximum recording time:  
SP mode: 4 hours with E-240  
LP mode: 8 hours with E-240
- 4 Select the programme position with PROGR +/-, You can also use number buttons on the remote control. For double-digit numbers (e.g. 14), first press +, then press 1 and 4.
- 5 Press REC C. The REC lamp on the front of the video TV lights up and recording begins.



### To stop recording

Press STOP ■.

When the tape reaches the end, the video TV rewinds the tape automatically to the beginning, then stops. This function does not work when the power of the video TV is off.

### To pause recording

Press PAUSE II.

To resume recording, press PAUSE II again.

You can cut out an unwanted scene during recording with this button.

- 1 Press PAUSE II when an unwanted scene appears on the screen. Recording pauses.
- 2 Press PAUSE II again to release the pause mode at the desired scene. Recording resumes from the point set in step 1.

When the recording pause mode lasts for about 5 minutes, the video TV stops recording.

### Recording with the TV off

Press C.

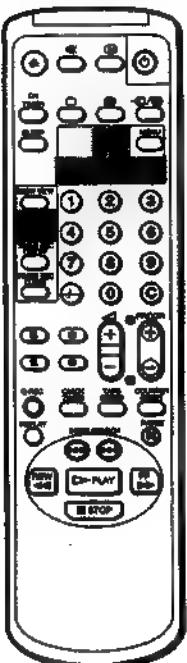
The TV screen is turned off and the C lamp lights up. The video TV continues recording.

### Watching a TV programme while recording another (KV-21V6D only)

You can watch a TV programme and record another at the same time if your video TV has two tuners. Only models KV-16V6D and KV-21V6D are equipped with two tuners.

Select the desired programme position with PROGR +/- or the number buttons on the remote control or PROGR +/- on the video TV.

# Recording TV Programmes Using the Timer



The Timer Recording function allows you to preset your video TV to record up to six programmes within a one-month period.

## Before you begin

- Press  $\odot$ , PROGR +/- or number buttons on the remote control, or PROGR +/- on the video TV to switch on the video TV.
- Make sure that the time and date clock are set. If not, the message "Please set the time" is displayed on the screen. Refer to "Setting the clock" on page 16.
- Make sure that the loaded cassette has its safety tab. If a cassette without safety tab is loaded, the message "Tape with safety tab is required for recording" is displayed.
- If you are using an indoor aerial, adjust the reception for the channel you want to record.

## Setting the timer

Example: Here is how to record a programme broadcast on programme position 26 from 20:15 to 21:55 on Saturday, 6th December 1997, in SP mode.

- Press TIMER ON SCREEN. The PROGRAMME LIST appears.



- Press OK. Today's date coloured red appears.

- Press + or - until "6 SAT" appears. For daily and weekly recording see "Daily/weekly recording" on page 30.

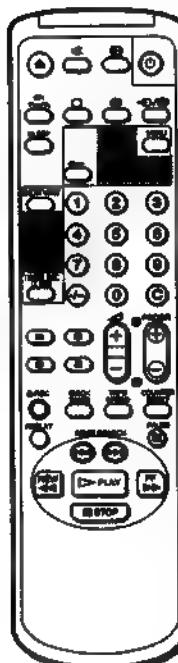


- Press OK, then set the hour of the recording start time to "20" with + or -.

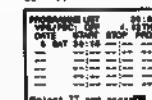


If you have made a mistake during timer setting  
Press  $\odot$  to return to the previous position and correct the setting.

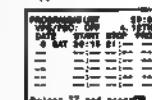
If you try to enter the recording start time prior to the current time  
All the items of the setting will be cleared.



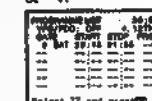
- Press OK, then set the minute of the recording start time to "15" with + or -.



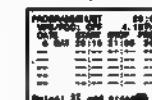
- Press OK, then set the hour of the recording stop time to "21" with + or -.



- Press OK, then set the minute of the recording stop time to "55" with + or -.



- Press OK, then set the programme position to "26" with + or -.



- Press OK, then set the recording speed to SP, using the + or - buttons.



If you try to do an incorrect operation  
The video TV displays a message on the screen to interrupt your setting.

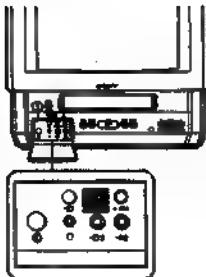
If you turn the  $\odot$  switch off  
The TIMER RBC buttons do not function.

- Press OK. The cursor (>) appears at the left margin.

- When you want to set other programmes, press - to move the cursor to the next line, then repeat steps 2 through 10.

- Press TIMER RBC ON/OFF.  
The TIMER RBC lamp on the front of the video TV lights up and the video TV enters timer recording standby mode.

Press TIMER ON SCREEN to erase the PROGRAMME LIST.  
Press  $\odot$  to turn the video TV off if you do not want to watch the TV.  
The video TV turns on automatically and starts recording at the preset start time, and goes off at the preset stop time.



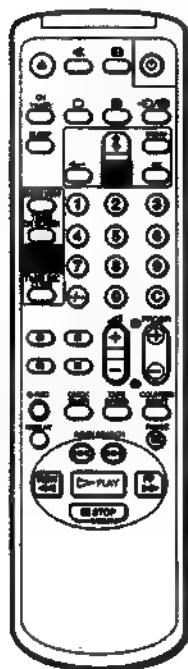
### Daily/weekly recording

You can preset your video TV to record the same programme every day of the week (daily recording) or the same programme on the same day every week (weekly recording). Press  $\downarrow$  in step 3 until the desired setting appears in the "DATE" position. With each press, the setting changes as follows:

4 (today)  $\rightarrow$  MON-SUN  $\rightarrow$  MON-SAT  $\rightarrow$  MON-FRI  $\rightarrow$  EVERY SAT  $\rightarrow$  EVERY FRI  $\rightarrow$  EVERY THU  $\rightarrow$  EVERY WED  $\rightarrow$  EVERY TUE  $\rightarrow$  EVERY MON  $\rightarrow$  EVERY SUN  $\rightarrow$  3 (next month)  $\rightarrow$  2, ...

### To stop timer recording

Press TIMER REC ON/OFF.  
The TIMER REC lamp turns off.

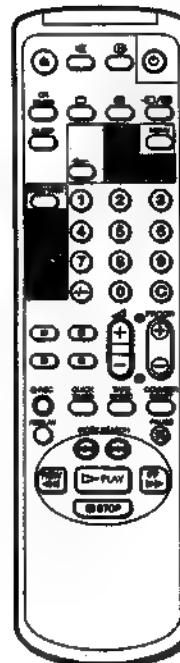


### Using the video TV before timer recording starts

You can watch a TV programme, check the timer settings and reset the counter in timer recording standby mode. However, press TIMER REC ON/OFF to turn off the TIMER REC lamp on the front of the video TV to do the following operations:

- eject the cassette
- use the tape operation buttons
- change or cancel the timer settings

Remember to press TIMER REC ON/OFF again to make the TIMER REC lamp light after the above operations.



### Checking the timer settings

You can display the list of the timer settings which you preset.

Press TIMER ON SCREEN.  
The PROGRAMME LIST appears.

PROGRAMME LIST	20:00
TYPE PROG. OFF	MON-SUN
DATE	1 day
PROGRAMME	MON-SUN
START TIME	21:00
END TIME	22:00
RECORDING TIME	1 P
NOTES	None

Press TIMER ON SCREEN again to erase the PROGRAMME LIST.

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### Changing or cancelling the timer settings

1 Press TIMER REC ON/OFF to turn off the TIMER REC lamp on the front of the video TV.

2 Press TIMER ON SCREEN to display the PROGRAMME LIST.

3 Select the setting you want to change or cancel with  $+$  or  $-$ .

PROGRAMME LIST	20:00
TYPE PROG. OFF	MON-SUN
DATE	1 day
PROGRAMME	MON-SUN
START TIME	21:00
END TIME	22:00
RECORDING TIME	1 P
NOTES	None

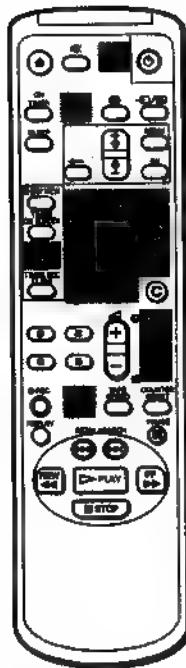
4 To change the setting

Using  $+$  or  $-$  and OK, re-enter all the items.  
Refer to "Setting the timer" steps 2 through 10 on pages 28 and 29.

To cancel the setting  
Press TIMER REC CLEAR.

5 Press TIMER ON SCREEN to return to the original screen.

6 If there are other timer settings on the list, press TIMER REC ON/OFF to set the video TV to timer recording standby mode.



## Recording using QUICK TIMER

You can preset your video TV to start timer recording immediately and to automatically stop recording after a specific time period. If you have not set the clock, QUICK TIMER recording cannot be used.

### If you are recording

- 1 Press QUICK TIMER on the remote control. "QUICK TIMER 0:00" appears on the screen.
- 2 Press QUICK TIMER repeatedly to select the recording time period. With each press, the time period changes as follows:

0:00 → 0:30 → 1:00 → ... → 7:30 → 8:00

Even if you switch off the video TV, it continues recording. After the selected time period has elapsed, recording stops automatically.

### If you are not recording

- 1 Press C, PROGR +/- or number buttons on the remote control, or PROGR +/- on the video TV to switch it on.
- 2 Insert a cassette with its safety tab.
- 3 Select the programme position which you want to record.
- 4 Press QUICK TIMER on the remote control. "QUICK TIMER 0:00" appears on the screen.
- 5 Press QUICK TIMER repeatedly to select the recording time period. With each press the time period changes as follows:

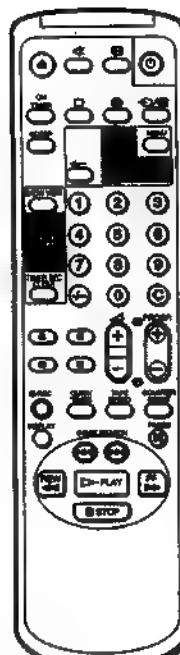
0:00 → 0:30 → 1:00 → ... → 7:30 → 8:00

The time period turns yellow and recording starts. Even if you switch off the video TV, it continues recording. When the preset time period has elapsed, the video TV stops recording.

To change the recording time period after QUICK TIMER recording begins  
Press QUICK TIMER until the desired time period appears.

To display the remaining time period during QUICK TIMER recording  
Press C. The recording time period decreases minute by minute.

To stop QUICK TIMER recording  
Press TIMER REC ON/OFF.



## Timer recording with VPS/PDC signals

The German broadcasting system transmits VPS (Video Programme System) signals or PDC (Programme Delivery Control) signals with the TV programmes. These signals assure you that your timer recordings are made regardless of broadcast delays, early starts, or broadcast interruptions. For example, if an urgent news bulletin interrupts a regular programme, recording stops. As soon as the interrupted programme resumes, recording starts again.

- 1 If the TIMER REC lamp is lit on the front panel, press TIMER REC ON/OFF to turn it off.

- 2 Press TIMER ON SCREEN. The PROGRAMME LIST screen appears.



- 3 Using the + or - buttons, select VPS/PDC, then press OK. VPS/PDC will turn red.

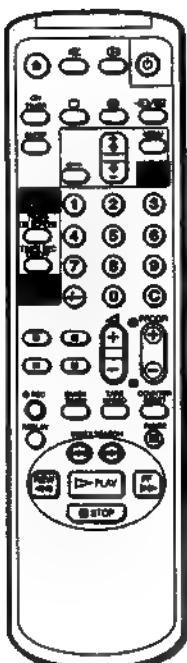


- 4 Using the + or - buttons, select ON, then press OK.



- 5 Set the timer following the steps in "Setting the timer" (pages 28 and 29).

# Recording TV Programmes Using ShowView



The ShowView function allows you to simplify the task of making timer recordings. Using ShowView, you can make all the necessary settings by just entering the desired programme's 9-digit code, which is available in your local programme guide. To take advantage of this function, you must first set up your video TV and assign programme positions to the various guide channels. For details, see "Setting up ShowView manually" on page 14.

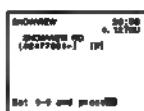
## Before you begin

- Press CI, PROGR +/- or a number button on the remote control, or PROGR +/- on the video TV to switch on the video TV.
- Make sure that the time and date clock are set correctly. If not, refer to "Setting the clock" on page 16.
- Make sure that the loaded cassette has its safety tab.

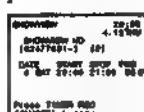
1 Press SHOWVIEW.  
The SHOWVIEW menu appears.



2 Press the number buttons to enter the desired programme's ShowView number.

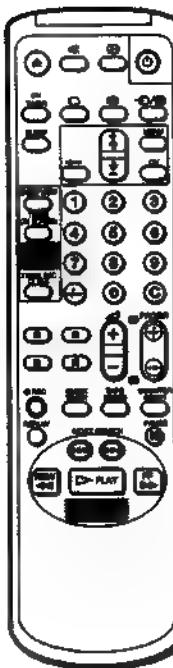


3 Press OK.  
The recording information appears: date, start and stop times, programme position number.



Check that the information is correct. If it is not, press TIMER RBC CLEAR to cancel the setting.

If you have made a mistake entering programme's ShowView number  
Press TIMER RBC CLEAR and re-enter the correct number.



4 Repeat steps 2 to 3 to preset another timer setting.

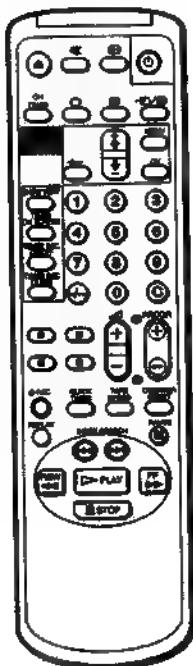
5 Press TIMER RBC ON/OFF.  
The TIMER RBC lamp on the front of the video TV lights up and the video TV enters timer recording standby mode.

## To stop recording

To stop the video TV while recording a programme, press STOP ■.

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## Switching Off Automatically — Sleep Timer



You can automatically switch the video TV into standby mode after a selected time period.

Press SLEEP.

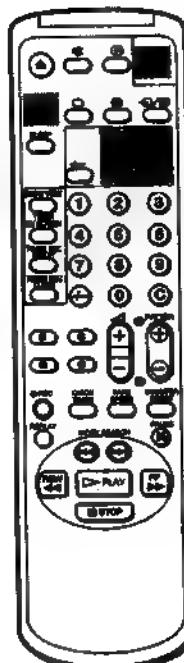
With each press, the time period (in minutes) changes as follows:

OFF → 30 → 60 → 90

One minute before the TV switches into standby mode, a message "Good night" is displayed on the screen.

To cancel the timer  
Press SLEEP to select "OFF".

## Switching On at Your Desired Time — On Timer



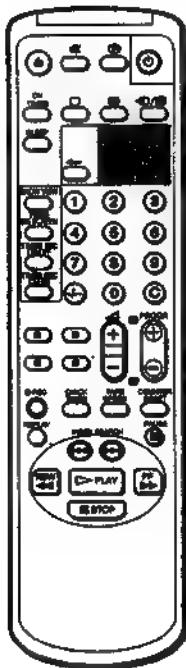
You can preset your video TV to automatically switch on at a desired time. You can choose either a TV programme or video playback to be switched on.

- 1 Press MENU to display the main menu.
- 2 Move the cursor (P) to "ON TIMER SET" with + or - and press OK. The ON TIMER SET menu appears.
- 3 Press OK.
- 4 Set the hour with + or - and press OK. The minute section turns red.
- 5 Set the minutes (by one minute) with + or - and press OK. The cursor appears beside "TIME".
- 6 Move the cursor (P) to "SOURCE" with + or - and press OK.
- 7 Select TV or VCR (video playback) with + or - and press OK. When you select TV, select the programme position with + or - and press OK.
- 8 Move the cursor (P) to "ON TIMER" with + or - and press OK, then select ON with + or - and press OK.
- 9 Press MENU to return to the original screen.
- 10 Press ON TIMER.

If you are not using the video TV, press to set the video TV in standby mode.

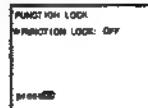
At the preset time, the video TV automatically switches on. If you do not press any button for 2 hours, the video TV automatically shuts off.

## Using FUNCTION LOCK

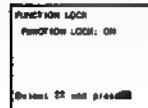


The FUNCTION LOCK feature prevents use of the buttons on the front of the video TV. You may want to use this feature to prevent small children from changing channels, viewing video tapes, etc.

- 1 Press MENU.  
The main menu appears.
- 2 Using the + 0 or - 0 buttons, move the cursor (>) to "FUNCTION LOCK," then press OK.  
The FUNCTION LOCK menu appears.

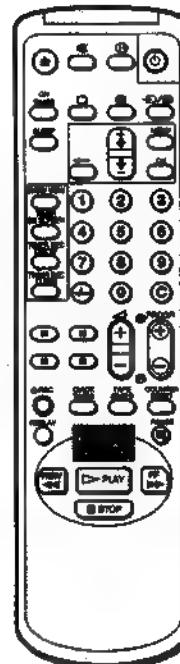


- 3 Press OK to start setting the FUNCTION LOCK.  
The ON/OFF section turns red.  
Using + 0 or - 0 buttons, select OFF or ON, then press OK.  
OFF: Factory setting.  
ON: The buttons on the video TV will no longer function (except the POWER button).



The remote control will still operate even if the FUNCTION LOCK is activated.

## Searching Using the INDEX Function



The video TV marks the tape with an index signal at the point where each recording begins. These signals can be used to find a specific recording. Your video TV is capable of searching 99 signals forward or backward on a tape.

- 1 Insert the tape.
- 2 Press INDEX SEARCH  $\lll$  /  $\ggg$  repeatedly to specify how many index signals ahead or behind you want to search.



The video begins searching, and the index number will appear on the screen, counting down to zero. When zero is reached, playback begins automatically.

### To stop searching

Press STOP ■.

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# Enhancing Video Picture Quality

## Adjusting the tracking

### Adjusting the tracking automatically

The tracking condition is automatically adjusted on this video TV. The AUTO TRACKING indicator will appear while the video TV is searching for the best tracking condition.

### Adjusting the tracking manually

If streaks or snow noise appear on the video playback picture, adjust the tracking condition manually.

- 1 Press MENU to display the main menu.
- 2 Move the cursor (P) to "TRACKING CONTROL" with + or - and press OK.

The TRACKING CONTROL menu appears.



- 3 Select MANUAL with + or - and press OK.

The tracking meter appears.

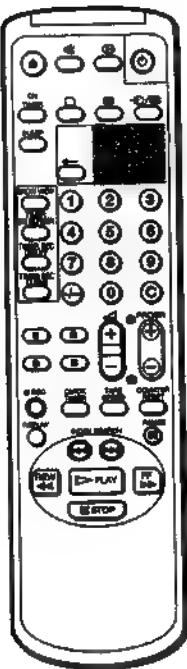


- 4 Using + or -, adjust the tracking to get the best picture.

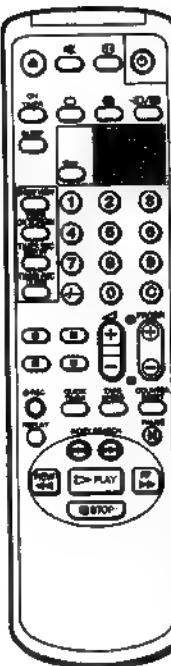
- 5 Press OK.

The main menu reappears.

- 6 Press MENU to return to the original screen.



To return to automatic tracking  
Select AUTO in the TRACKING CONTROL menu with + or - and press OK.



## Adjusting with the optimum picture control (OPC)

This function allows you to improve playback and recording quality by adjusting the system parameter automatically according to the condition of the video tape.

This function is set to ON at the factory. To maintain better picture quality, leave the function on. The OPC function works on all types of tapes, even on rental tapes.

To change the setting, use the menu display.

- 1 Press MENU to display the main menu.
- 2 Move the cursor (P) to "VCR MODE" with + or - and press OK.

The VCR MODE menu appears.



- 3 Move the cursor (P) to "OPC" with + or - and press OK.

- 4 Select ON or OFF with + or - and press OK.



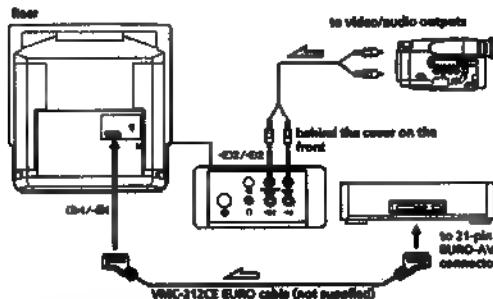
- 5 Press MENU to close the main menu.

## About the Auto Head Cleaner

The Auto Head Cleaner built into this set automatically cleans the video heads when a cassette is loaded or unloaded. If the effect of head cleaning is not sufficient even after a cassette has been loaded/unloaded several times, clean the heads using the Sony V-25CL video head cleaning cassette. For details on head cleaning see page 46.

# Connecting Optional Equipment

## Watching the picture input from optional equipment



### To watch the video input signal

Press  $\text{CH} \downarrow/\uparrow$  repeatedly until the desired input indicator appears on the screen.

- $\text{CH} \downarrow/\uparrow$  1 for audio/video input or RGB input through the  $\text{GND}/\text{G}1/\text{G}2$  1 connector
- $\text{CH} \downarrow/\uparrow$  2 for audio/RGB input through the  $\text{GND}/\text{G}1$  1 connector
- $\text{CH} \downarrow/\uparrow$  2 for audio/video input through the  $\text{GND}/\text{G}2/\text{G}1$  2 jacks located behind the cover on the front of the video TV

#### Note

When connecting optional equipment, such as videogames, please use the connecting cables recommended by the equipment's manufacturer.

## Editing with another VCR

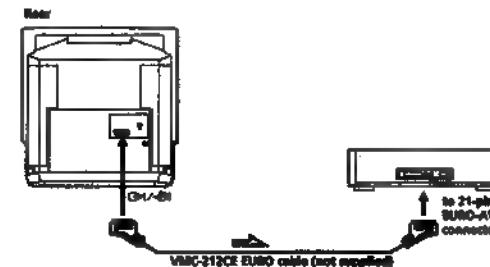
Using an additional VCR, you can edit a tape.

### Editing from another VCR

Connections are the same as in "Watching the picture input from optional equipment."

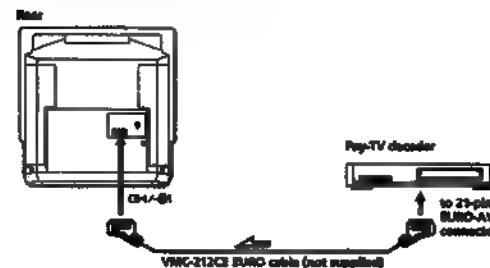
GB

### Editing onto another VCR



## Watching the pay-TV channel (KV-21V6D only)

You can connect the pay-TV decoder to the  $\text{GND}/\text{G}1/\text{G}2$  1 connector using VMC-212CE EURO cable. Set the Pay-TV decoder following the steps in "Setting a Pay-TV channel" (page 13).



## Troubleshooting

Function	Problems	Possible causes and remedies
TV reception	No picture (screen is dark), no sound	<ul style="list-style-type: none"> <li>The mains lead is disconnected. ⇒ Connect the mains lead.</li> <li>The video TV is switched off. ⇒ Press <b>CH</b>, PROGR +/- or programme number on the remote control, or PROGR +/- on the video TV.</li> </ul>
	Good picture but no sound	<ul style="list-style-type: none"> <li>The headphones are connected to the <b>□</b> jack. ⇒ Disconnect the headphones.</li> <li>The <b>OK</b> is displayed on the screen. ⇒ Press <b>OK</b>.</li> <li>Press <b>CH +/-</b>.</li> </ul>
	No colour or poor colour (screen is dark) for colour programmes, but good sound	<ul style="list-style-type: none"> <li>Adjust "CONTRAST," "COLOUR," and "BRIGHTNESS" in the PICTURE CONTROL menu. (page 18)</li> </ul>
	No picture, no sound from video input source	<ul style="list-style-type: none"> <li>The connecting cord between the video TV and the input source is disconnected. ⇒ Connect it firmly.</li> <li>Input is not selected correctly. ⇒ Press <b>CH</b> until the desired input indicator appears. (page 42)</li> </ul>
Clock and timer	The clock has stopped and "—/—" is displayed	<ul style="list-style-type: none"> <li>The power has been interrupted, the <b>□</b> (MAIN POWER) switch is turned off or the mains lead is disconnected for more than a week. ⇒ Re-set the clock and timer settings if necessary. (pages 16, 28, 34)</li> </ul>
Playback	Power is on, but the tape does not run.	<ul style="list-style-type: none"> <li>The safety device has been activated. ⇒ Switch off, disconnect the mains lead, and leave the set for about one minute.</li> </ul>
	Poor playback picture	<ul style="list-style-type: none"> <li>The COL SYS setting in the VCR MODE menu is not correct. ⇒ Set COL SYS to the system that the tape was recorded in. (page 25)</li> <li>Adjust the tracking. (page 40)</li> <li>The video heads are dirty. ⇒ Clean the heads using the Sony V-25CL video head clearing tape (page 46). If the cleaning tape is not available in your area, have the heads cleaned at your nearest Sony service facility. (Do not use a commercially available wet-type cleaning tape, as it may damage the video heads.)</li> <li>The tape is worn out. ⇒ Use a new tape.</li> </ul>
	The sound drops out	<ul style="list-style-type: none"> <li>The tape is defective. ⇒ Use a new tape.</li> </ul>

Function	Problems	Possible causes and remedies
Recording	The cassette is ejected when you press REC <b>□</b> .	<ul style="list-style-type: none"> <li>The safety tab of the cassette has been removed. ⇒ Cover the tab hole with adhesive tape, or use another cassette with a safety tab. (page 22)</li> </ul>
	Recording does not function.	<ul style="list-style-type: none"> <li>No cassette has been inserted. ⇒ Insert a cassette with the safety tab.</li> <li>The tape is at its end. ⇒ Rewind the tape.</li> </ul>
	Pay-TV programme was not recorded.	<ul style="list-style-type: none"> <li>The Pay-TV channel was not set properly. ⇒ Check the setting steps. (page 13)</li> </ul>
	You cannot view one programme while recording another.	<ul style="list-style-type: none"> <li>Verify your model number. ⇒ Only models KV-14V6D and KV-21V6D are able to play one programme while recording another.</li> </ul>
Timer recording	Time settings cannot be made.	<ul style="list-style-type: none"> <li>The clock has not been set. ⇒ Set the current time and date. (page 16)</li> <li>You made a mistake when setting the timer. ⇒ Check the setting steps. (pages 26 and 29)</li> </ul>
	The cassette is ejected when you press TIMER REC ON/OFF.	<ul style="list-style-type: none"> <li>The safety tab of the cassette has been removed. ⇒ Cover the tab hole with adhesive tape, or use another cassette with a safety tab.</li> </ul>
	The TIMER REC lamp does not light up even though you press TIMER REC ON/OFF.	<ul style="list-style-type: none"> <li>No cassette has been inserted. ⇒ Insert a cassette with its safety tab.</li> <li>The tape is at its end. ⇒ Rewind the tape.</li> <li>No setting is made for timer recording. ⇒ Set the programme for timer recording. (pages 26 and 29)</li> </ul>
	Timer recording was not made.	<ul style="list-style-type: none"> <li>You did not press TIMER REC ON/OFF. ⇒ There has been a power interruption lasting more than a week.</li> </ul>
Others	A cassette cannot be inserted.	<ul style="list-style-type: none"> <li>Another cassette is already inserted. ⇒ Press <b>□</b> to eject the cassette.</li> </ul>
	The remote control does not work.	<ul style="list-style-type: none"> <li>The batteries are low. ⇒ Replace the batteries. (page 4)</li> <li>The batteries are installed incorrectly. ⇒ Install the batteries with correct polarities. (page 4)</li> </ul>

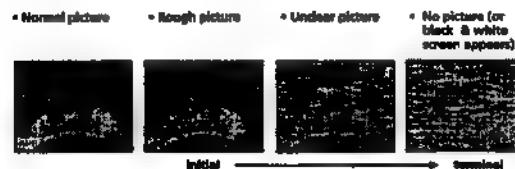
GB

## Taking Care of Your Video TV

### Video head cleaning

When playback pictures are noisy and hardly visible, or when no picture appears, the video heads may be contaminated. In such a case, clean the video heads using the V-25CL video head cleaning tape (not supplied), or ask Sony service personnel to clean the video heads.

#### Symptoms caused by contaminated video heads



### Worn video heads

If your video TV displays a poor picture after you clean the video heads, you may need to replace them. Consult your dealer or the Sony Service Center nearest you.

### Check the video heads after 1,000 hours of use

A video TV is a high precision machine. It must record on or play from magnetic tapes on which the image signals from the colour TV or the video camcorder are recorded. The video heads or mechanical parts for transporting the tape are contaminated or worn after extended use. You should have your video TV checked after each 1,000 hours of use.

#### Notes

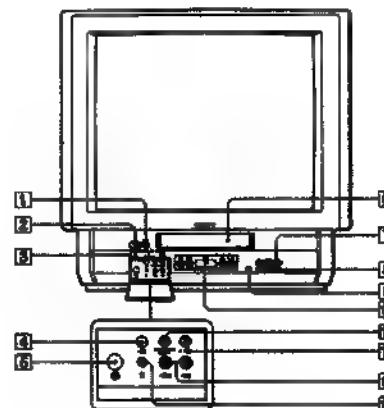
Do not use a commercially available wet-type cleaning tape, as it may damage the video heads.

## Index to Parts and Controls

### Video TV set—front

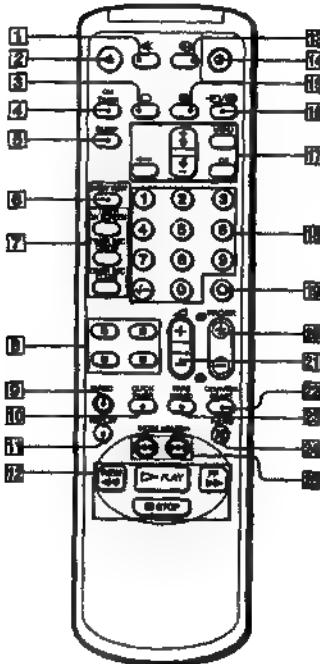
This section briefly describes the buttons and controls on the video TV set and on the remote control. For more information, refer to the pages next to each description.

KV-27VSD, KV-27VRD



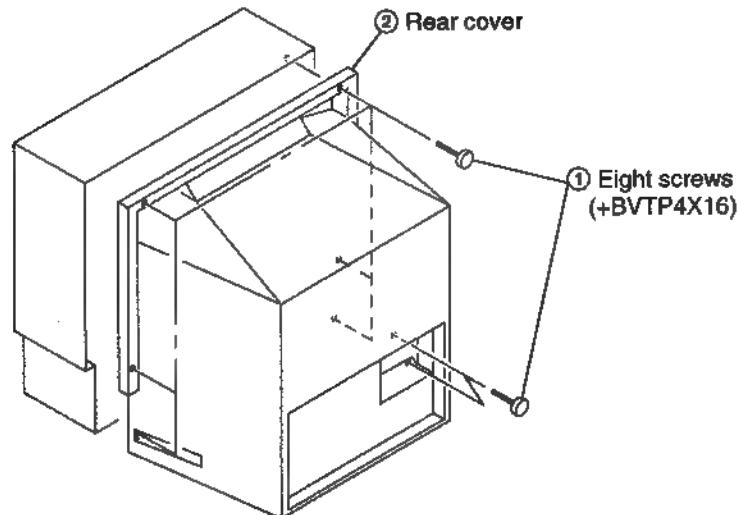
- 1 EJECT button (page 22)
- 2 STANDBY button (page 17)
- 3 Lamp  
○ (standby) (page 17)  
TIMER REC (recording) (page 29)  
REC (recording) (page 27)
- 4 -C (input select) button (pages 19, 42)
- 5 (MAIN POWER) switch (pages 6, 17)
- 6 Cassette compartment (page 22)
- 7 PROGR (programme) +/- buttons (pages 17, 27)
- 8 ▲ (volume) +/- buttons (page 17)
- 9 Remote sensor
- 10 Tape transport buttons (page 23)
- 11 TIMER REC ON/OFF button (pages 29, 30)
- 12 REC (recording) ● button (page 27)
- 13 -C2/-C2 (video/audio input) jacks (page 42)
- 14 Φ (headphones) jack (page 19)

## Remote control

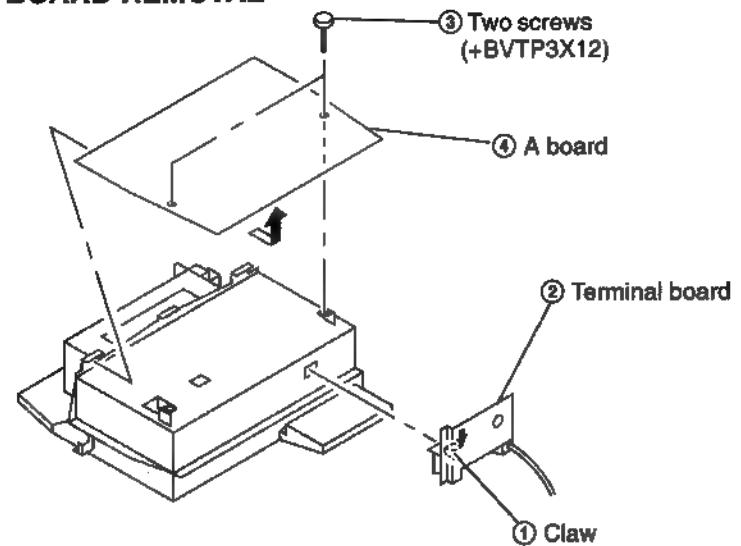


## SECTION 2 DISASSEMBLY

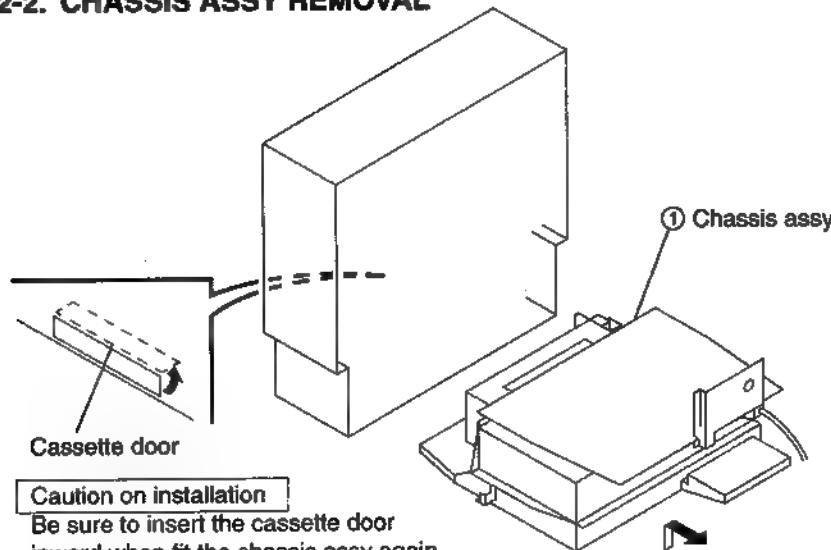
### 2-1. REAR COVER REMOVAL



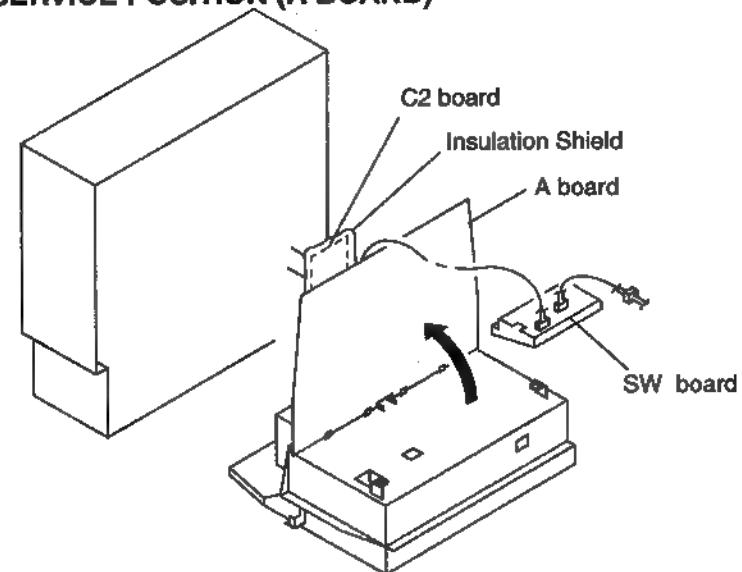
### 2-3. A BOARD REMOVAL



### 2-2. CHASSIS ASSY REMOVAL



### 2-4. SERVICE POSITION (A BOARD)

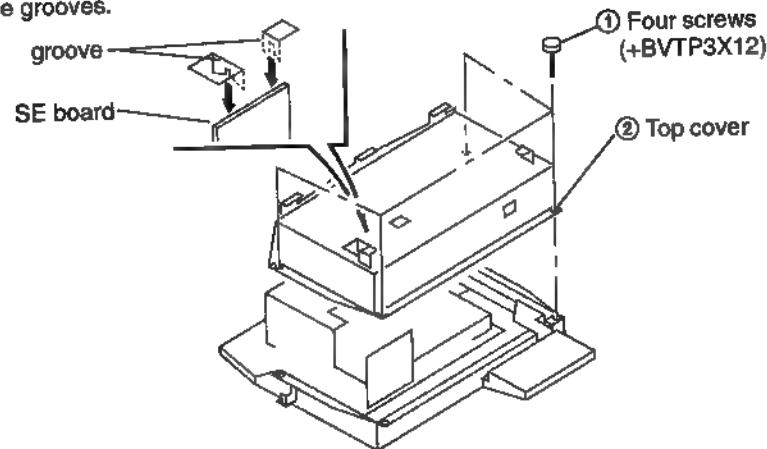


## 2-5. TOP COVER REMOVAL

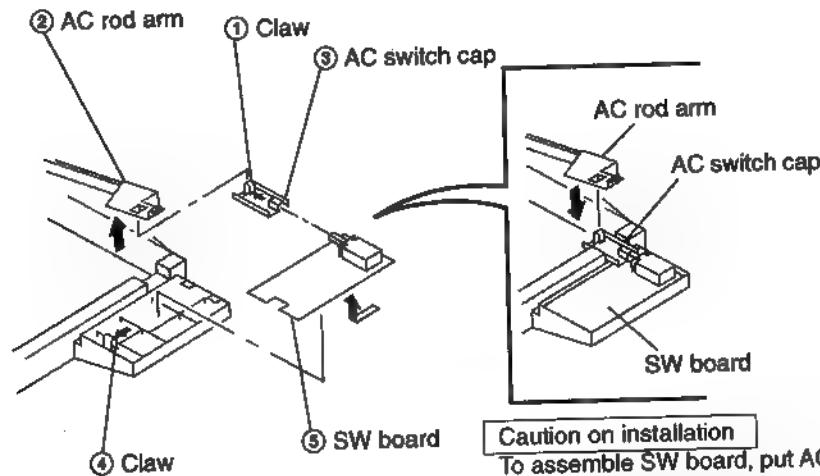
(21V5B/V6B)

### Caution on installation

To put back Top cover, fit SE board in the grooves.



## 2-6. SW BOARD REMOVAL

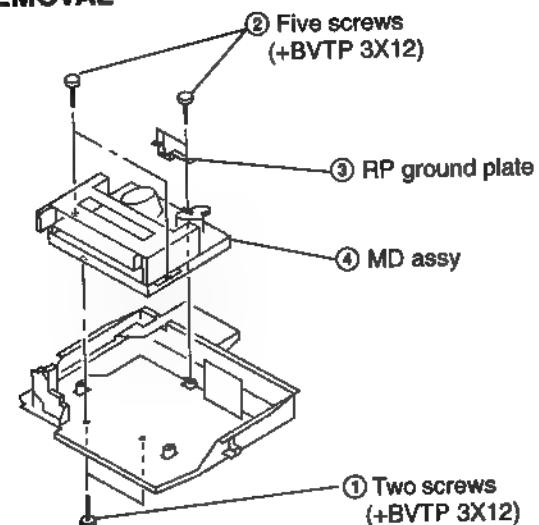


### Caution on installation

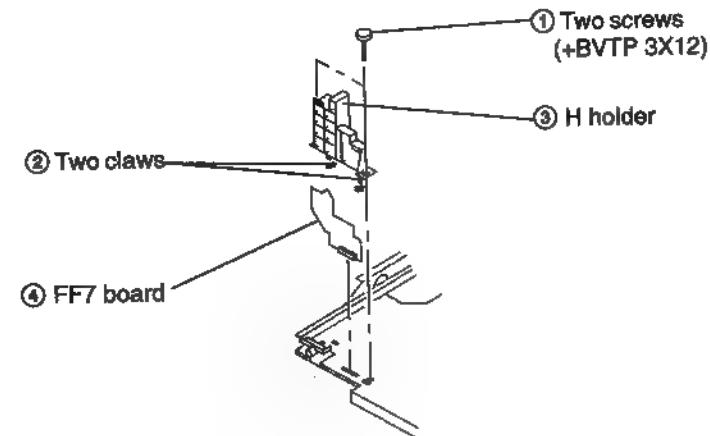
To assemble SW board, put AC switch cap onto the board and hook up AC rod arm to the switch cap.

## 2-7. MD ASSY REMOVAL

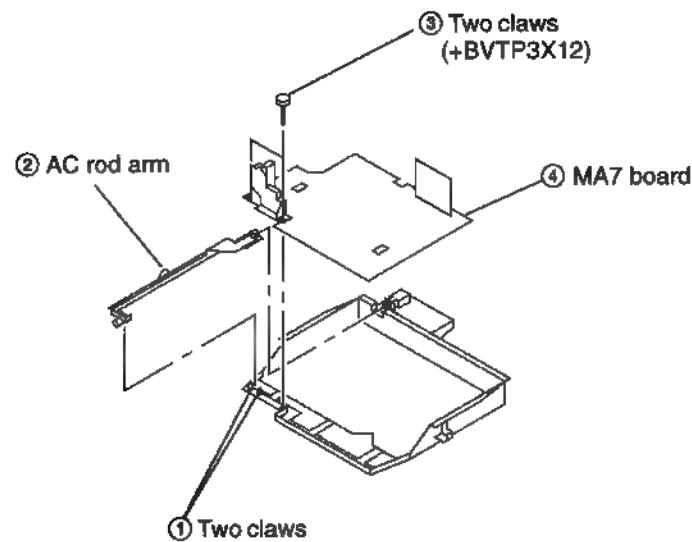
② Five screws  
(+BVTP 3X12)



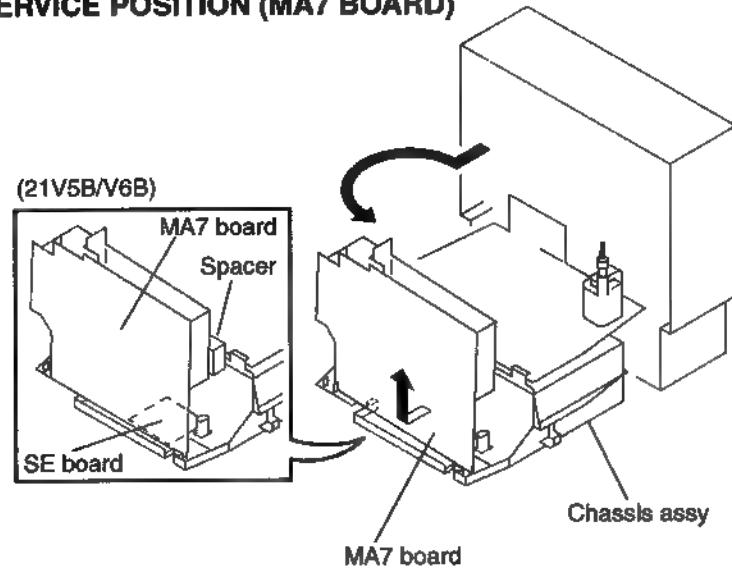
## 2-8. FF7 BOARD REMOVAL



## 2-9. MA7 BOARD REMOVAL



## 2-10. SERVICE POSITION (MA7 BOARD)

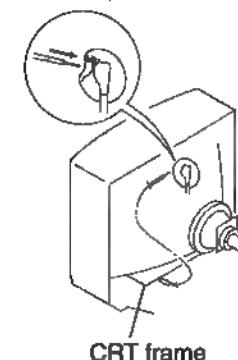
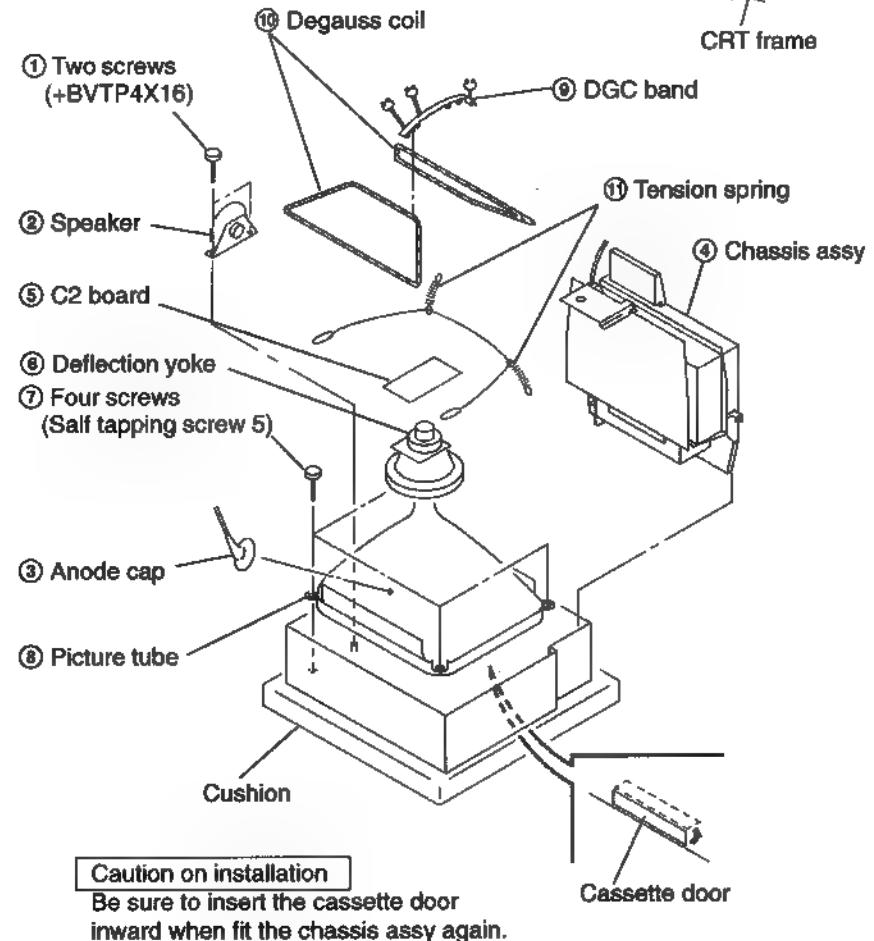


## 2-11. PICTURE TUBE REMOVAL

### WARNING : Before removing anode cap

H. V. remains in the CRT even after the power is disconnected.

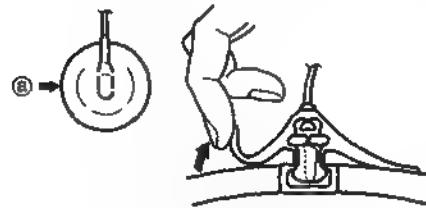
To avoid electrical shock, before attempting to remove the anode cap, discharge CRT : Short between anode and CRT frame.



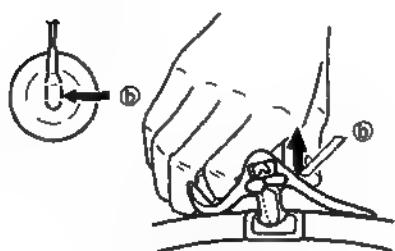
## • REMOVAL OF ANODE-CAP

NOTE : Short circuit the anode of the picture tube and the anode cap to the metal chassis. CRT shield or carbon painted on the CRT, after removing the anode.

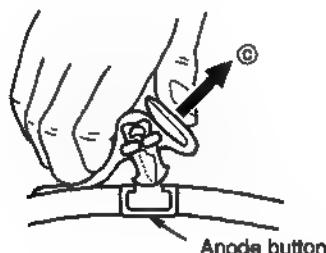
## • REMOVING PROCEDURES



① Turn up one side of the rubber cap in the direction indicated by the arrow ①.



② Using a thumb pull up the rubber cap firmly in the direction indicated by the arrow ②.

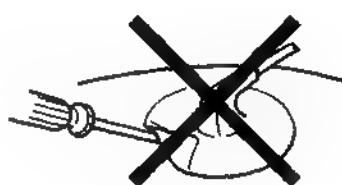
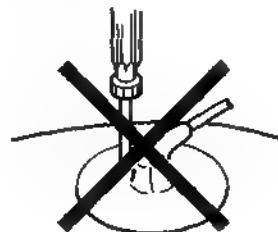


Anode button

③ When one side of the rubber cap is separated from the anode button, the anode-cap can be removed by turning up the rubber cap and pulling up it in the direction of the arrow ③.

## • HOW TO HANDLE AN ANODE-CAP

- ① Don't hurt the surface of anode-caps with sharp shaped material!
- ② Don't press the rubber hardly not to hurt inside of anode-caps! A material fitting called as shatter-hook terminal is built in the rubber.
- ③ Don't turn the foot of rubber over hardly! The shatter-hook terminal will stick out or hurt the rubber.



## SECTION 3

### SELF DIAGNOSIS FUNCTION

When turning on the TV, a self diagnosis function is executed.

If no acknowledgment is returned from a device which is turned "ON", the device has a problem.

In this case, one of the LED's responding to the problem device will flicker a defined number of times.

The flickering frequency responding to each failed device is shown below.

Board	A board	A board	A board
Ref. No.	Q802, T801	IC304, IC501	D807
Device	H. OUT, FBT	YCJ, V-OUT	200V RECT, C board
Flickering Frequency	2	4	5

All the devices are checked one after another from the left of the table.

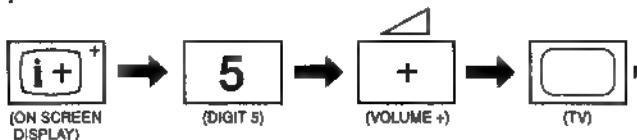
So, if more than 1 device has failed, only the one the left side will flicker.

#### 1. Self Diagnosis Screen Display

On-screen display information shows if there occurred any intermittent Failures before, such as "intermittent no picture", etc. that serviceman cannot confirm the symptom (if the failure detection circuit has operated before).

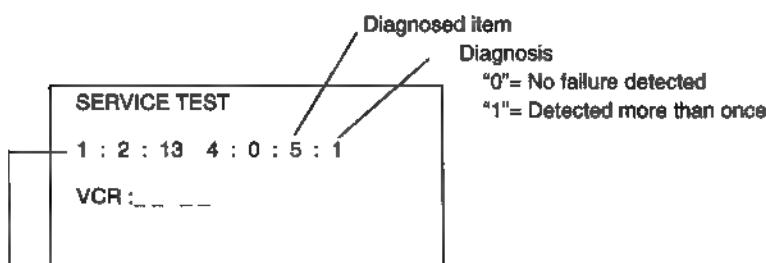
##### <How to Display>

When STAND BY condition, press the remote commander buttons quickly in the sequence below.



\*Be careful, it's different from the way to enter in service mode ("VOLUME +") !!

#### Self Diagnosis Screen



## 2. Clearance of Self Diagnosis Screen

The Diagnosis (result) is not automatically cleared. After checking the screen be sure to clear it by resetting the diagnosis result to "0".

Otherwise the self diagnosis system will not operate properly in case of newly occurred failures.

### <How to Clear>

To clear the diagnosed result, press the remote commander buttons in the sequence below while the diagnosis screen is displayed.

Don't enter in the service mode and do it. If you do it, you will rewrite all the other electric adjustment data !

CHANNEL **8** → **0**

### <How to Exit from the Screen>

To exit from the self diagnosis screen, power off by pressing the power button on the remote commander or the TV main unit.

## SECTION 4

### SET-UP ADJUSTMENTS

- The following adjustments should be made when a complete realignment is required or a new picture tube is installed.
- These adjustments should be performed with the rated power supply voltage, unless otherwise noted.

The Contrast and Brightness controls should be set as follows unless otherwise noted:

CONTRAST control ..... 80%  
(or Normal by commander)  
BRIGHTNESS control ..... 50%

Perform the adjustments in the following order:

1. Beam Landing
2. Convergence
3. Screen (G2), Drive, White Balance and Sub Bright.
4. Focus

**Note:** Test Equipment Required.

1. Color bar/Pattern Generator
2. Degausser
3. DC Power Supply
4. Digital multimeter
5. Oscilloscope

#### Preparation:

- In order to reduce the influence of external magnetic forces on the picture tube, face the TV set in an easterly or westerly direction.
- Turn the power switch for the unit ON and erase the magnetic force using a degausser.

#### 4-1. BEAM LANDING

Demagnetize with a degausser.

1. Input an all white raster signal from the pattern generator.  
CONTRAST } normal  
BRIGHTNESS }
2. Switch the raster signal of the pattern generator to Red.
3. Move the deflection yoke backward, and adjust with the purity control so that Red is at the center and the Blue and Green are evenly spaced at the sides. see (Fig. 4-1 – 4-3)
4. Move the deflection yoke forward, and adjust so that the entire screen becomes Red. (Fig. 4-1)
5. Switch the raster signal to Blue and then Green to confirm the condition.
6. When the position of the deflection yoke has been determined, tighten it with the deflection yoke mounting screw.
7. When the landing at the corners is not correct, adjust by using disk magnets. (Fig. 4-4)

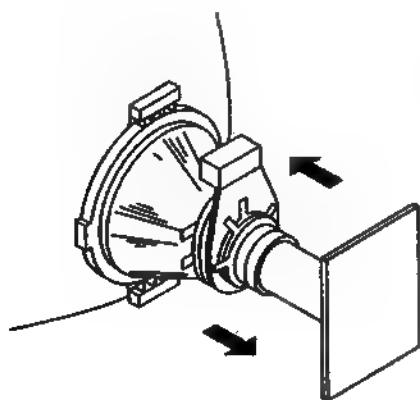


Fig. 4-1

Fig. 4-2

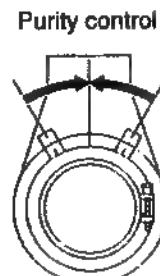


Fig. 4-3

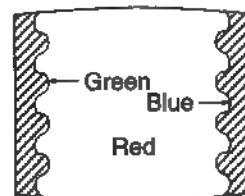
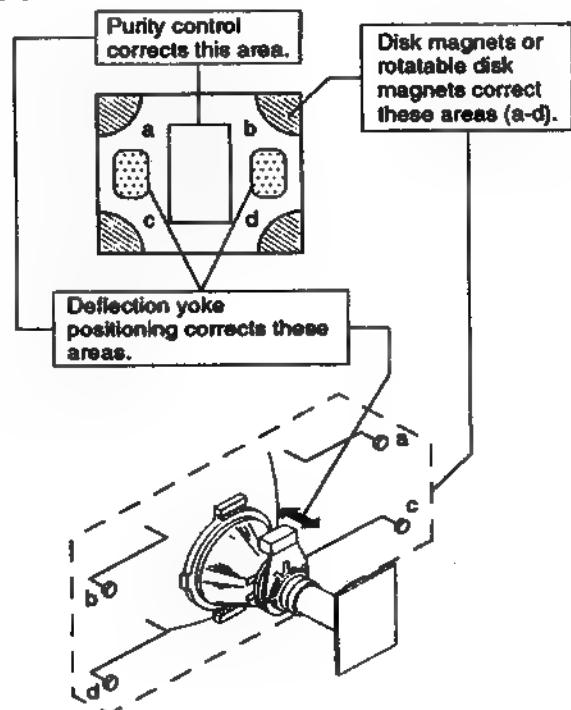


Fig. 4-4

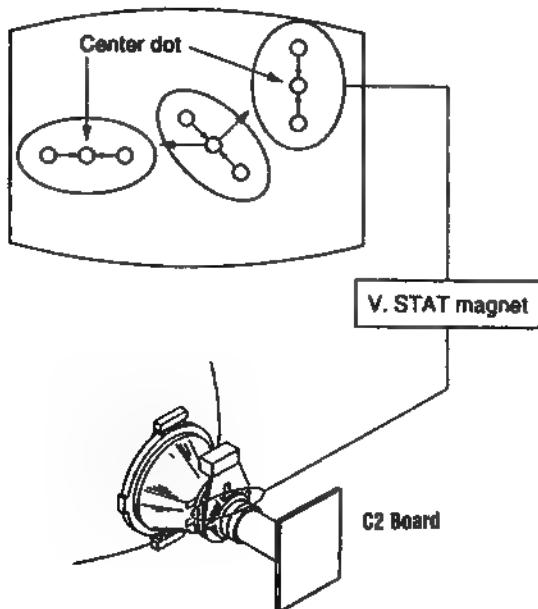


## 4-2. CONVERGENCE

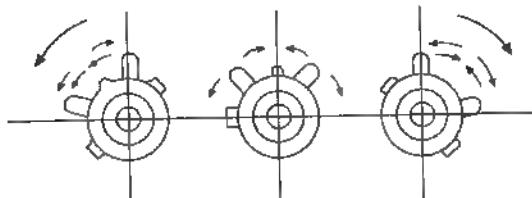
### Preparation:

- Before starting, perform FOCUS, H.SIZE, and V.SIZE adjustments.
- Set the BRIGHTNESS control to minimum.
- Input a dot pattern from the pattern generator.

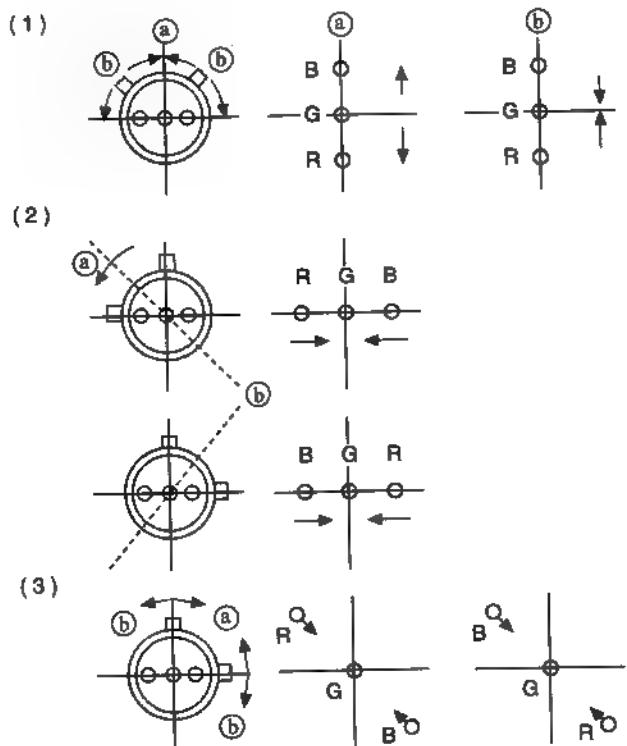
### (1) Horizontal and Vertical Static Convergence Adjustment



1. Adjust the V. STAT magnet to converge the Red, Green and Blue dots at the center of the screen. (Vertical and Horizontal movement)
- Tilt the V. STAT magnet and adjust the static convergence by opening or closing the V. STAT magnet.



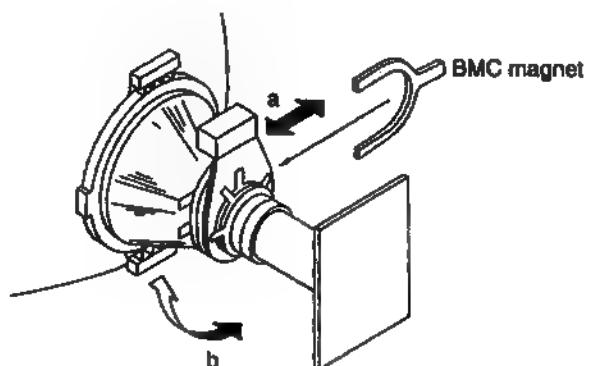
2. When the V. STAT magnet is moved in the direction of the (a) and (b) arrows, the Red, Green and Blue dots move as shown below.



If the Red and Blue dots do not converge with the Green dots, perform the following steps.

1. Move the BMC magnet (a) to correct for insufficient H.static convergence.
2. Rotate the BMC magnet (b) to correct for insufficient V.static convergence.

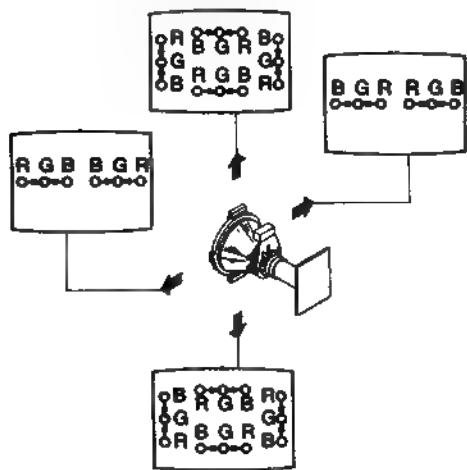
In either case, repeat the Beam Landing Adjustment.



## (2) Dynamic Convergence Adjustment

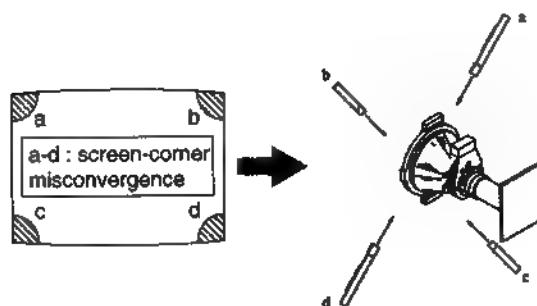
### Preparation:

- Before starting to perform the Horizontal and Vertical static convergence adjustment.
- 1. Slightly loosen the deflection yoke screw.
- 2. Remove the deflection yoke spacers.
- 3. Move the deflection yoke for best convergence as shown below.
- 4. Tighten the deflection yoke screw.
- 5. Install the deflection yoke spacers.



## (3) Screen-corner Convergence Adjustment

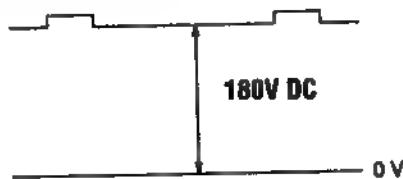
Affix a Permalloy ass'y corresponding to the misconverged areas



## 4-3. SCREEN (G2), WHITE BALANCE, and SUB BRIGHT

### (1) Screen (G2) Adjustment

1. Set the PICTURE and BRIGHT (FBT) to normal.
2. Put to VIDEO input mode without signals.
3. Connect R, G, and B of the C board cathode to the oscilloscope.
4. Adjust G2 (FBT) volume to the value below.

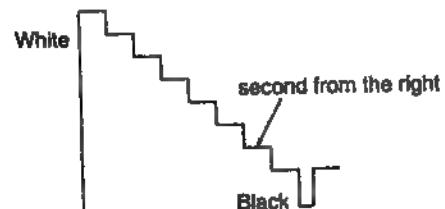


### (2) White Balance Adjustment

1. Set to Service Mode.
2. Input white raster signal.
3. Set the PICTURE to minimum.
4. Select SBRT (14) with **1** and **4**, and then set the level to minimum with **3** and **6**.
5. Select GCUT (17) and BCUT (18) with **1** and **4**, and adjust the level with **3** and **6** for the best white balance.
6. Set the PICTURE to maximum.
7. Select GDRV (15) and BDRV (16) with **1** and **4**, and adjust the level with **3** and **6** for the best white balance.
8. Write into the memory by pressing **MUTING** then **0**.

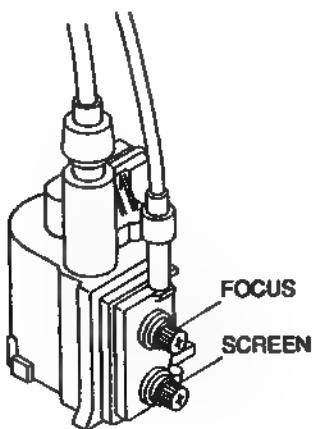
### (3) Sub Bright Adjustment

1. Set to service mode.
2. Input a staircase signal of black to white from the pattern generator.
3. BRIGHT.....50%  
PICTURE.....minimum
4. Select SBRT (14) with **1** and **4**, and adjust SBRT level with **3** and **6** so that the second stripe from the right is dimly lit.



#### 4-4. FOCUS

Adjust the FOCUS control FBT so that the whole screen is in best focus.



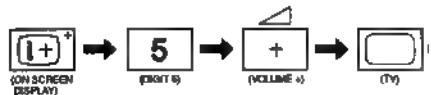
## SECTION 5

### CIRCUIT ADJUSTMENTS

Service adjustment to this model can be performed with the supplied Remote Control Commander RM-C810, RM-C811, RM-C812 and RM-C813.

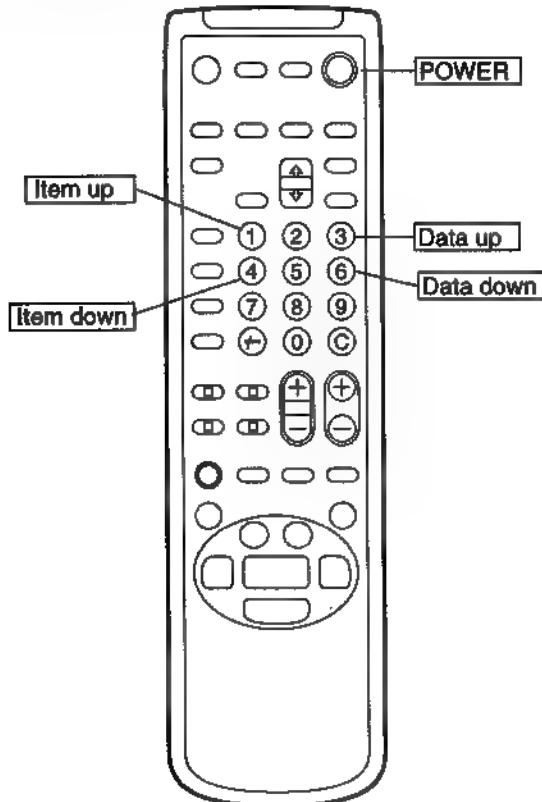
#### 5-1. HOW TO ENTER INTO SERVICE MODE

1. Turn on the main power of the set and enter into stand-by mode.
2. Press the following sequence of buttons on the Remote Control Commander.

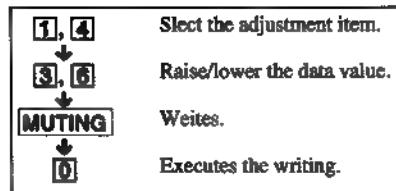


"Service mode" will appear in the top right corner of the screen. Other status information will also be displayed.

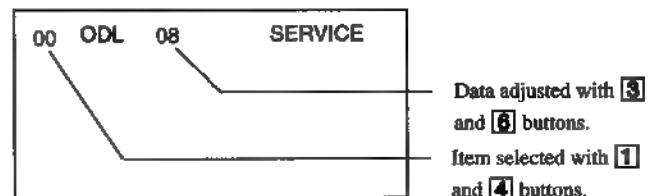
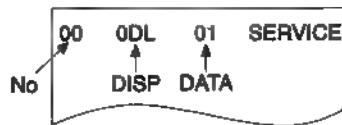
3. Press the "1" or "4" buttons to select the adjustment item from the table.
4. Press the "3" or "6" buttons to change the data as required.
5. Turn off the power to quit the service mode when adjustments are completed.



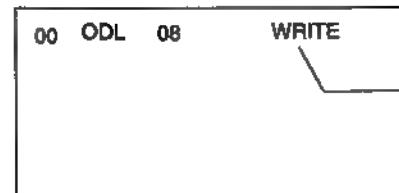
RM-C810



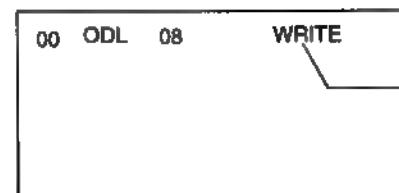
7, 0 All service data becomes the values in memory.  
 0, 0 All used control goes to the standard state.  
 5, 0 Service data initialization (Be sure not to use usually.)  
 2, 0 Write 50Hz adjustment data to 60Hz, or vice versa.



Data adjusted with 3 and 6 buttons.  
 Item selected with 1 and 4 buttons.



The display changes from SERVICE to WRITE. (Red)



The WRITE display then changes back to SERVICE.

**Range of adjustments available from the on screen menu system.**

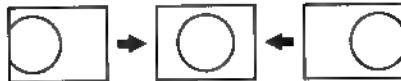
No.	DISP	DATA RANGE	STANDARD DATA	Item	Device
00	ODL	00-FF	8	ON Delay timer	
01	OSH	00-3F	5	OSD Horizontal Position	CXP85460-063Q-TL (μ-COM)
02	MUT	00-01	1	Auto Muting of No Sync	
03	32AJ	00-01	OFF	32KHz Adjust Test Mode	S3510A(Clock)
04	SCON	00-0F	9	Sub CONTRAST	CXA2076Q-TL (Y/C/J)
05	TRAP	00-0F	7	Chroma Trap fO	
06	SSHP	00-0F	7	Sub SHARPNESS	
07	POVR	00-03	3	Pre/Over-Shoot ratio Switching	
08	DL	00-07	5	Y Delay Control	
09	DTRA	00-01	1	DC-TRAN	
10	DPIC	00-01	1	D PIC	
11	TOT	00-01	1	TOT	
12	SSAT	00-4F	9	Sub COLOR	
13	SHUE	00-4F	7	Sub HUE	
14	SBRT	00-4F	1A	Sub BRIGHT	
15	GDRV	00-3F	1D	■ Drive	
16	BDRV	00-3F	16	B Drive	
17	GCUT	00-0F	4	G Cutoff	
18	BCUT	00-0F	4	B Cutoff	
19	DCOL	00-01	0	Dynamic Color Switch	
20	GAMM	00-03	1	Gamma Correction	
21	REFP	00-03	2	Reference Pulse Timing Control	
22	RON	00-01	1	R ON	
23	GON	00-01	1	G ON	
24	BON	00-01	1	B ON	
25	YS1	00-01	1	YS1 OFF	
26	AFC	00-03	1	AFC loop gain switching (TV)	
27	PAFC	00-03	1	AFC loop gain switching (PB)	
28	VBLK	00-03	3	VBLK Width Control	
29	HPOS	00-0F	7	Horizontal Position	
30	VPOS	00-3F	1F	V Position	
31	VSIZ	00-3F	27	V Size	
32	VLIN	00-0F	6	V Linearity	
33	SCOR	00-0F	2	S Correction	
34	AFCB	00-0F	7	AFC BOW	
35	AFCA	00-0F	7	AFC ANGLE	
36	PCMP	00-3F	15	PIN COMP	
37	HSIZ	00-3F	25	H Size	
38	EHTH	00-03	3	EHT-H	
39	EHTV	00-03	3	EHT-V	
40	PPHS	00-0F	5	PIN PHASE	
41	UCNP	00-0F	6	UP Corner-Pin	
42	LCNP	00-0F	7	LO Corner-Pin	
43	VASP	00-3F	2F	V Aspect	
44	ZOOM	00-01	0	Zoom mode	
45	VSCR	00-3F	1F	V Scroll	
46	JUMP	00-01	0	Jump Switch	
47	ULIN	00-0F	0	Upper V Linearity	
48	LLIN	00-0F	0	Lower V Linearity	
49	LBLK	00-0F	7	Left H Blanking	
50	RBLK	00-0F	7	Right H Blanking	
51	SCP R	00-03	1	SCP BGR	
52	SCP F	00-03	1	SCP BGF	
53	KLOF	00-01	0	KIL-OFF	
54	CTYP	00-01	1	CRT-TYPE	
55	ID0	00-01	0	Model ID0 (NO USE)	CXP85460-063Q-TL (μ-COM)
56	ID1	00-01	0	Model ID1 (NO USE)	
57	ID2	00-01	0	Model ID2 (NO USE)	
58	ID3	00-01	0	Model ID3 (NO USE)	

## 5-2. DEFLECTION SYSTEM ADJUSTMENT

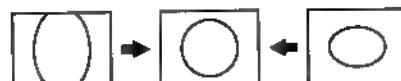
1. Enter into the service mode.
2. Using the "1" or "4" buttons select the Adjust item.
3. Press the "3" or "6" button to enter the adjustment submenu.
4. Select and adjust each item in order to obtain the optimum image.

No.	DISP	DATA	Range
29	HPOS	7	00 - 0F
31	VSIZ	27	00 - 3F
32	VLIN	6	00 - 0F
33	SCOR	2	00 - 0F
34	AFCB	7	00 - 0F
35	AFCA	7	00 - 0F
36	PCMP	15	00 - 3F
37	HSIZ	25	00 - 3F
40	PPHS	5	00 - 0F
41	UCNP	6	00 - 0F
42	LCNP	7	00 - 0F

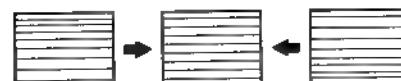
### 29 HPOS (H POSITION)



### 31 VSIZ (V SIZE)



### 32 VLIN (V LINEARITY)



### 33 SCOR (VS-CORRECTIONIZE)



### 34 AFCB (AFC BOW)



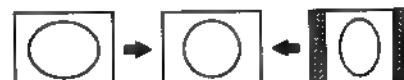
### 35 AFCA (AFC ANGLE)



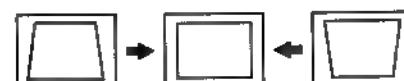
### 36 PCMP (PIN CORRECTION)



### 37 HSIZ (H SIZE)



### 40 PPHS (PIN PHASE)



### 41 UCNP (UPPER CORNER PIN)



### 42 LCNP (LOWER CORNER PIN)



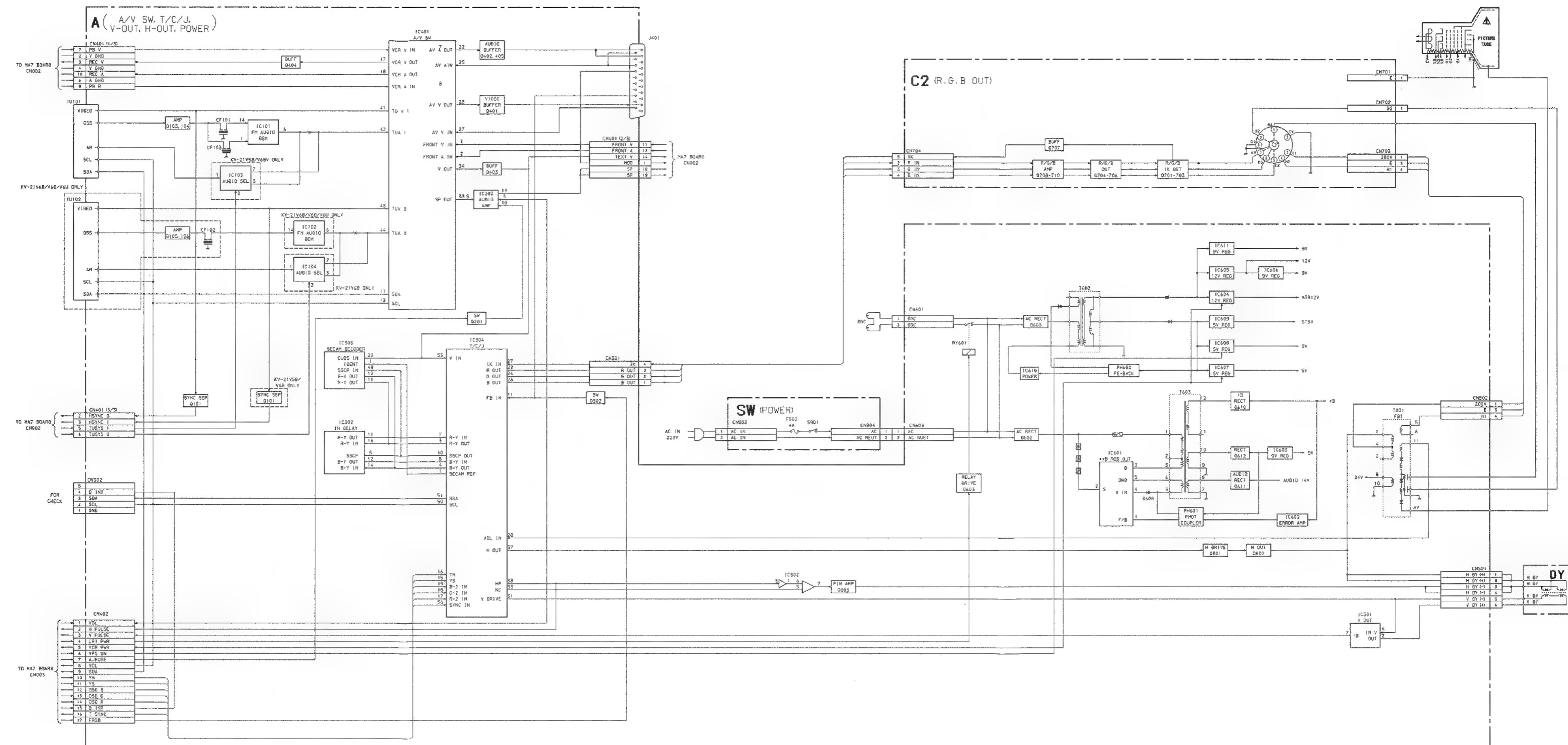
## 5-3. A BOARD ADJUSTMENT AFTER IC002 (MEMORY) REPLACEMENT

1. Enter to Service Mode.
2. Press commander buttons **5** and **0** (Data Initialize), and **2** and **0** (Data Copy) to initialize the data.
3. Call each item number and check if the respective screen shows the normal picture.  
In cases where items are not well adjusted, rectify the items with fine adjustment.  
Write the data per each item number (**MUTING** + **0**).
4. Press commander buttons **8** and **0** (Test Normal) to return the user controls to the setting that was set on shipment from the factory (This will also cancel Service Mode).

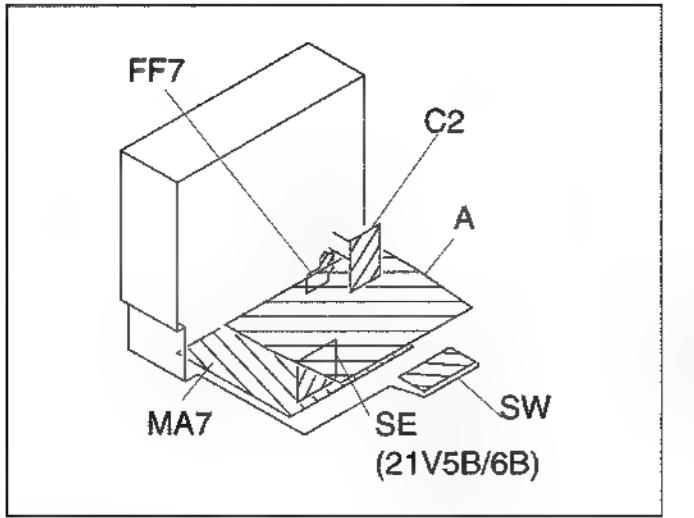
**TV SECTION**

## SECTION B DIAGRAMS

## 6-1. BLOCK DIAGRAM



## 6-2. CIRCUIT BOARDS LOCATION



COIL	: LF-8L MICRO INDUCTOR
CAPACITOR	: TA TANTALUM
: PS	STYROL
: PP	POLYPROPYLENE
: PT	MYLAR
: MPS	METALIZED POLYESTER
: MPP	METALIZED POLYPROPYLENE
: ALB	BIPOLAR
: ALT	HIGH TEMPERATURE
: ALR	HIGH RIPPLE

Note: The components identified by shading and mark are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un trame et une marque sont critiques pour la sécurité. Ne les remplacer que par une pièce portant numéro spécifié.

## 6-3. PRINTED WRING BOARDS AND SCHEMATIC DIAGRAMS

Note:  
 • Capacitors are with out voltage indication are all 50V.  
 • All electrolytics are in 50V unless otherwise specified.  
 • All resistors are in ohms.  
 $K\Omega=1000\Omega$ ,  $M\Omega=1000k\Omega$   
 • Indication of resistance, which dose not have one for rating electrical power, is as follows.

Pitch : 5mm  
 Rating electrical power :  $1/4$  W

: nonflammable resistor.  
 : fusible resistor.  
 : internal component.

: panel designation and adjustment for repair.  
 All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

As to the voltage value shown by the semiconductors on the Schematic Diagram, see the another list

• Readings are taken with color-bar signal input.  
 • Readings are taken with a  $10M\Omega$  digital multimeter.  
 • Voltages are dc with respect to ground unless otherwise noted.

• Voltage variations may be noted due to normal production tolerances.

• All voltages are in V.

\* : Measurement impossibility.

• : B-line.

• : B-line.

(Actual measured value may be different).

• : signal path. (RF)

• Circled numbers are waveform references.

Reference information

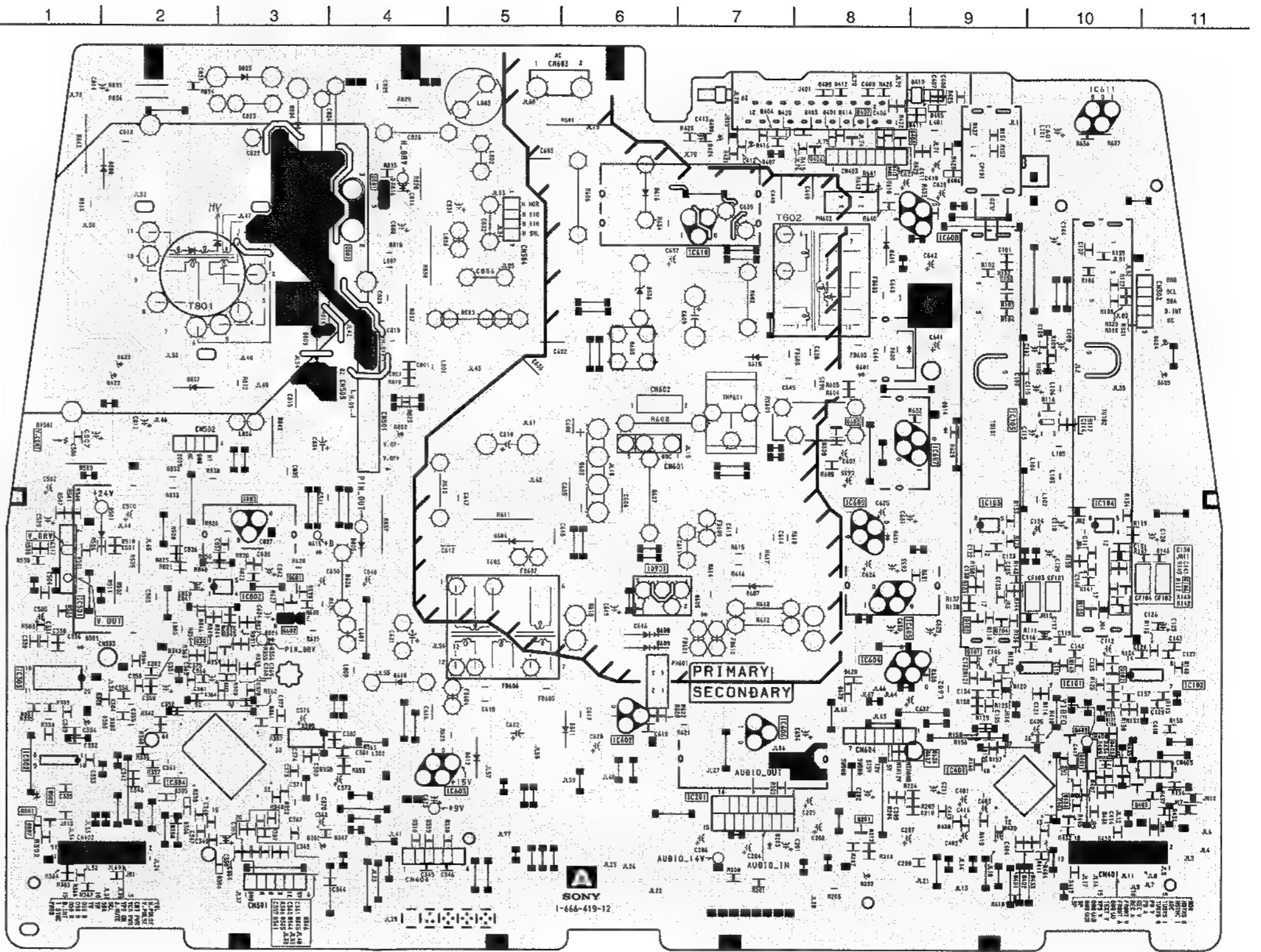
RESISTOR	: RN METAL FILM
	: RC SOLID
	: FPRD NONFLAMMABLE CARBON
	: FUSE NONFLAMMABLE FUSIBLE
	: RW NONFLAMMABLE WIREWOUND
	: RS NONFLAMMABLE METAL OXIDE
	: RB NONFLAMMABLE CEMENT
	:  ADJUSTMENT RESISTOR

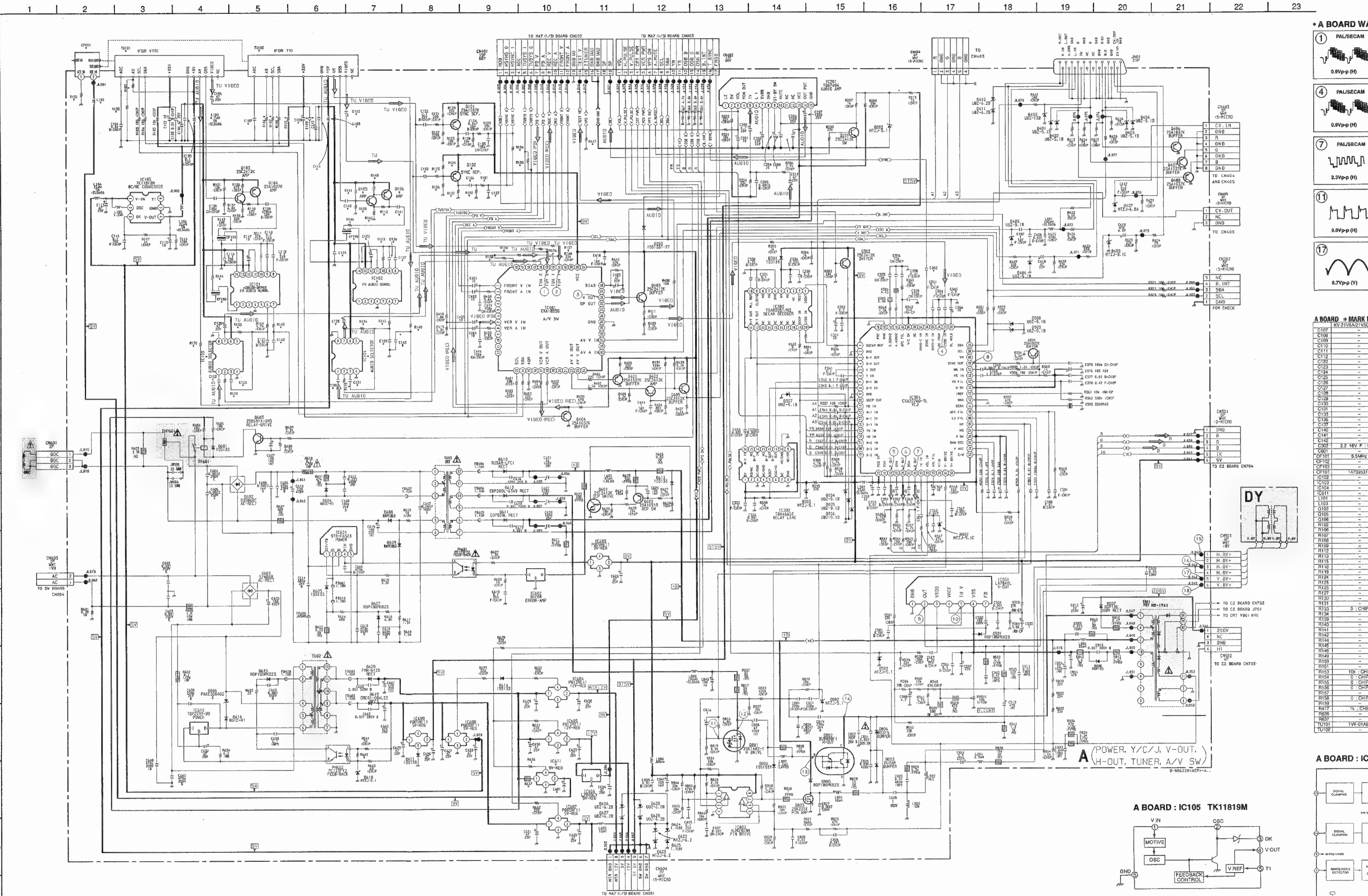
(Chip semiconductors that are not actually used are included.)

Ver.1.4

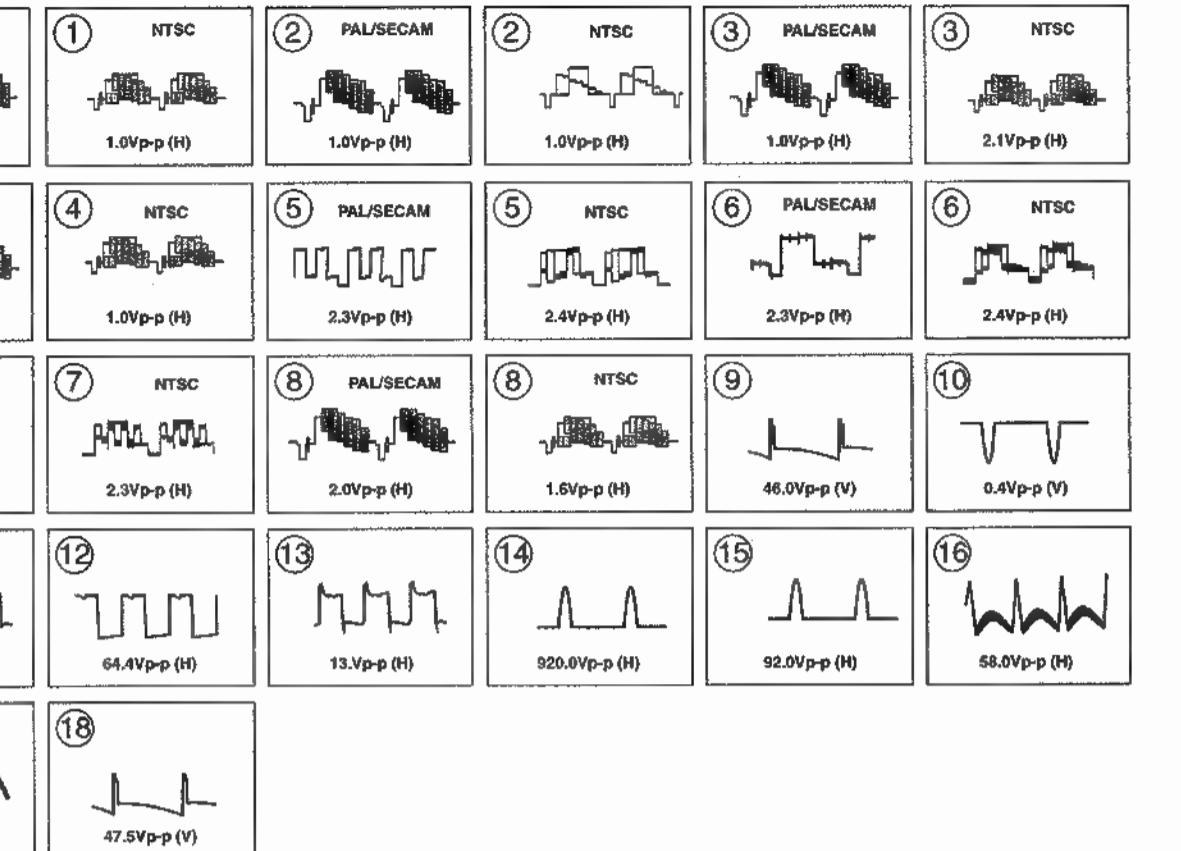
**A** [ POWER, Y/C/J, TUNER,  
 A/V SW, H-OUT, V-OUT ]

- A BOARD -



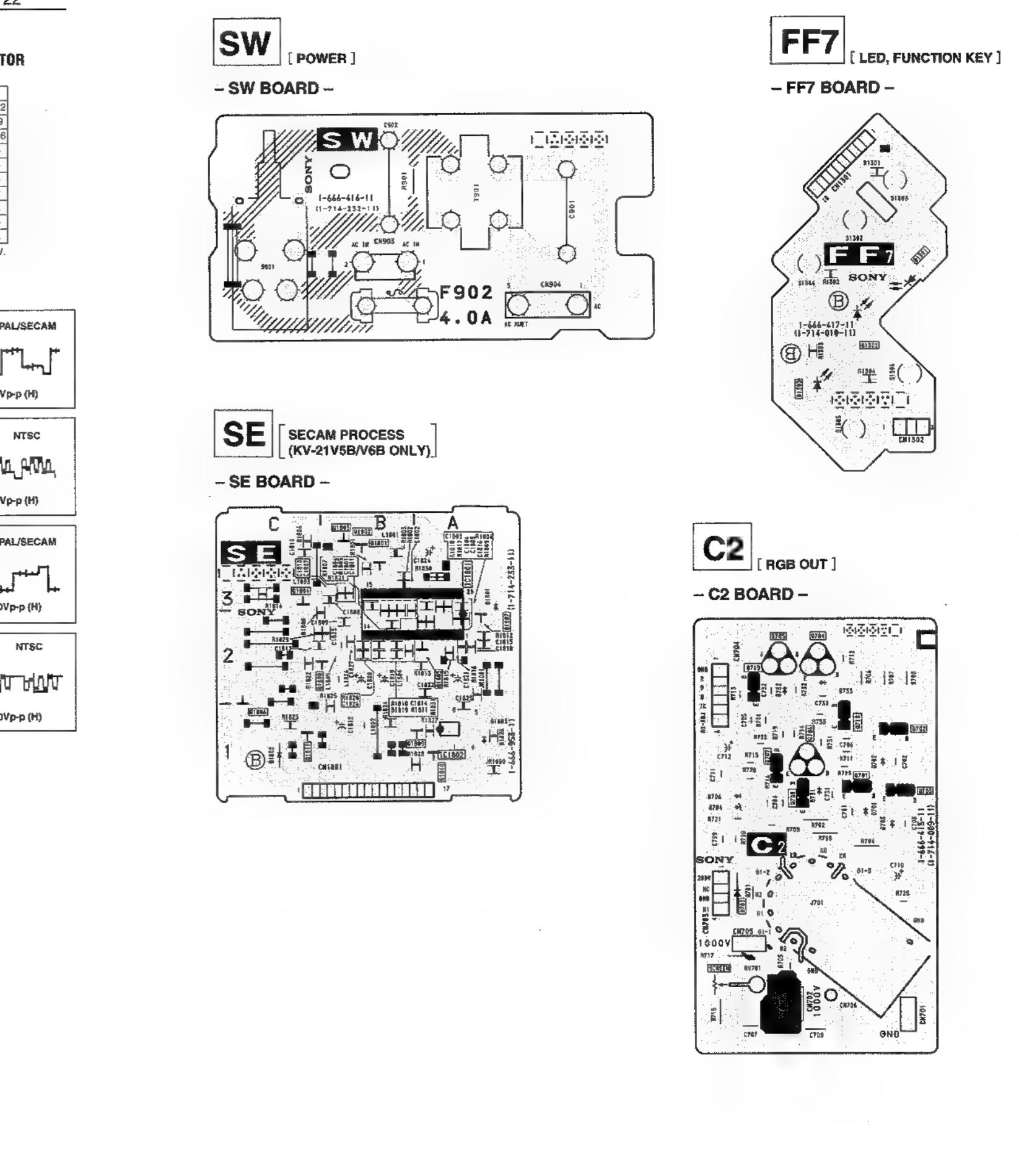
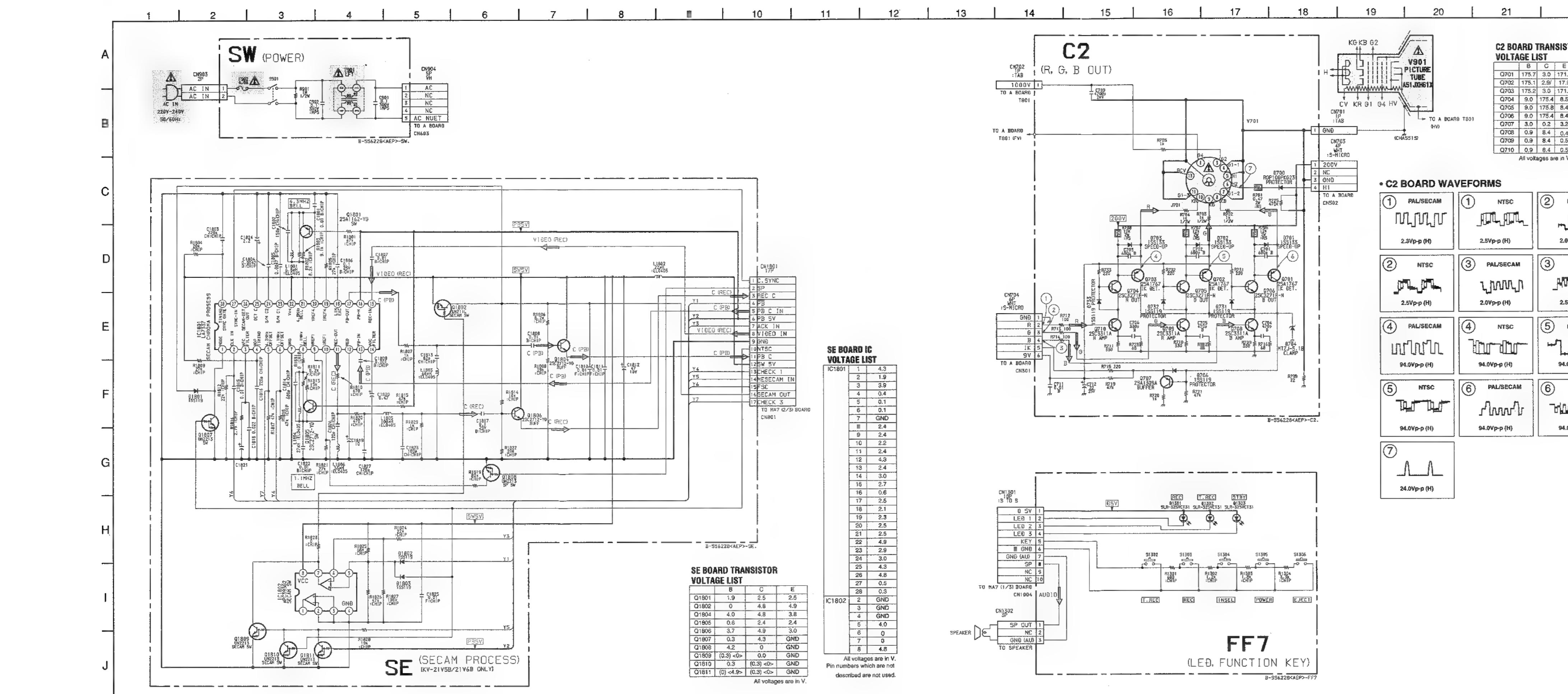


**A BOARD WAVEFORMS**



**A BOARD MARK LIST**

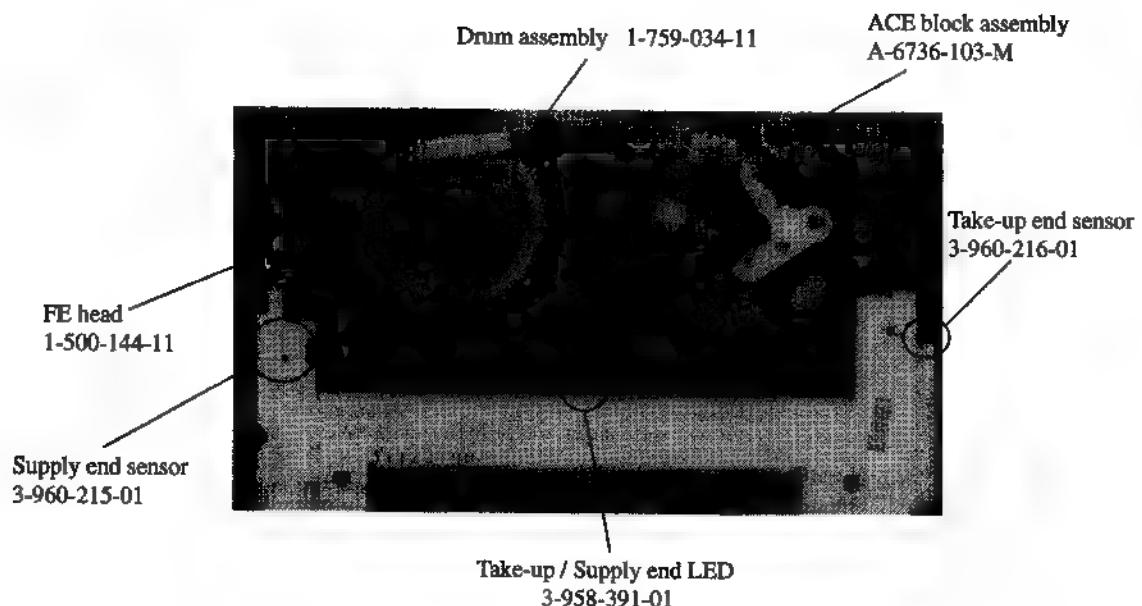
	KV-21V5A21	V02221V5E	KV-21V5B	KV-21V5K	KV-21V5U	KV-21V6A21V6B21V6E	KV-21V6B	KV-21V6U
C107	0	2.2	8.9	0	2.1	8.9	0.01	2.1
C108	0.02	8.5	2.1	0.01	8.5	0.01	2.1	1.1
C109	0.03	1.7	4.3	0.01	1.7	4.3	0.01	1.7
C110	0.04	4.3	2.9	0.01	4.3	2.9	0.01	4.3
C111	0.05	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C112	0.06	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C113	0.07	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C114	0.08	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C115	0.09	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C116	0.10	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C117	0.11	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C118	0.12	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C119	0.13	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C120	0.14	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C121	0.15	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C122	0.16	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C123	0.17	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C124	0.18	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C125	0.19	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C126	0.20	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C127	0.21	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C128	0.22	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C129	0.23	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C130	0.24	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C131	0.25	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C132	0.26	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C133	0.27	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C134	0.28	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C135	0.29	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C136	0.30	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C137	0.31	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C138	0.32	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C139	0.33	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C140	0.34	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C141	0.35	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C142	0.36	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C143	0.37	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C144	0.38	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C145	0.39	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C146	0.40	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C147	0.41	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C148	0.42	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C149	0.43	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C150	0.44	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C151	0.45	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C152	0.46	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C153	0.47	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C154	0.48	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C155	0.49	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C156	0.50	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C157	0.51	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C158	0.52	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C159	0.53	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C160	0.54	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C161	0.55	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C162	0.56	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C163	0.57	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C164	0.58	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C165	0.59	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C166	0.60	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C167	0.61	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C168	0.62	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C169	0.63	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C170	0.64	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C171	0.65	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C172	0.66	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C173	0.67	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C174	0.68	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C175	0.69	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C176	0.70	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C177	0.71	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C178	0.72	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C179	0.73	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C180	0.74	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C181	0.75	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C182	0.76	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C183	0.77	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C184	0.78	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C185	0.79	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C186	0.80	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C187	0.81	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C188	0.82	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C189	0.83	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C190	0.84	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C191	0.85	4.2	2.8	0.01	4.2	2.8	0.01	4.2
C192	0.86	4.2	2					



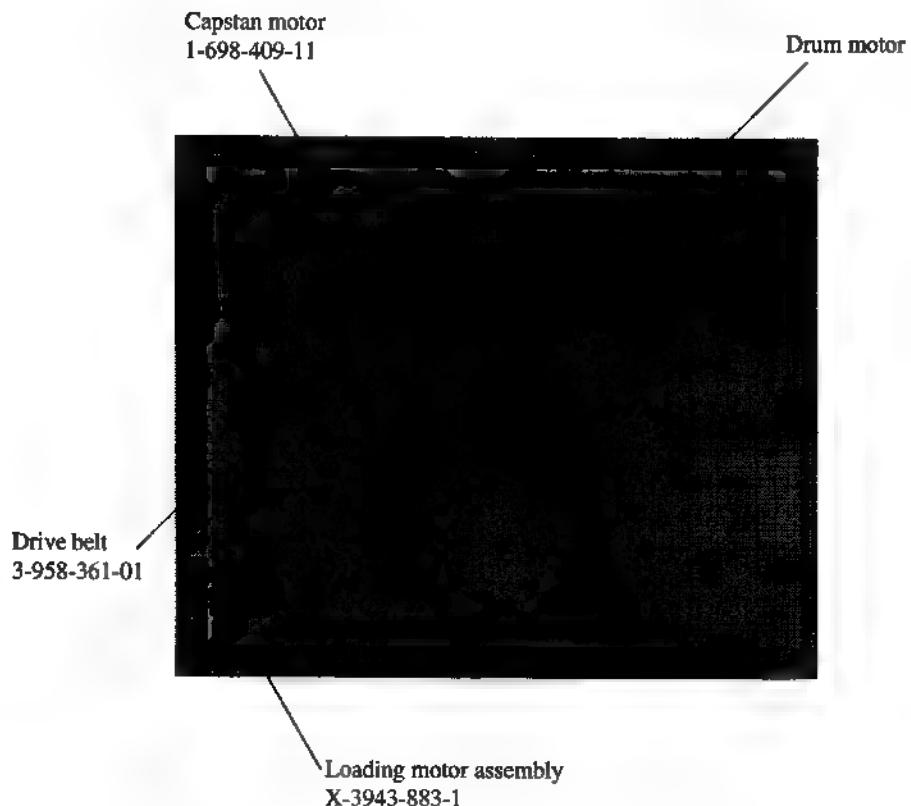
## SECTION1 GENERAL

### 1-1. INTERNAL VIEWS

#### - Top Side -



#### - Bottom Side -



## SECTION 2

### CIRCUIT ADJUSTMENTS

Necessary items and indications for total adjustment of electric circuit of this unit will be described in this chapter.

#### 2-1. Instruments to be Used

- 1) Color TV
- 2) Signal or dual trace type oscilloscope, band more than 30 MHz, delay, as provided.
- 3) Frequency counter (4 digits or more)
- 4) PAL pattern generator
- 5) Digital voltmeter
- 6) Audio level meter
- 7) Audio generator
- 8) Attenuator
- 9) Distortion meter
- 10) Alignment tape

Part code : H7099052H (MH-2)

#### 2-2. Connection

Unless otherwise specified, connect and adjust the measurement equipment as follows.

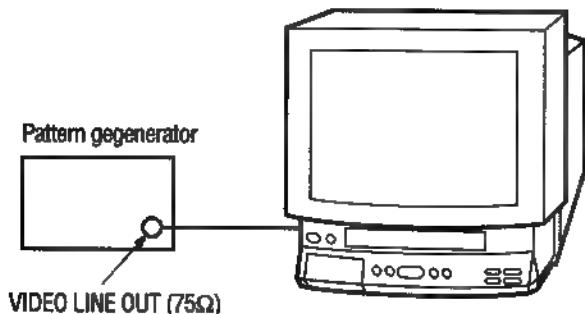


Fig. 2-1.

#### SWITCHING POSITION ADJUSTMENT

1. Play back the alignment tape (KRV-44PS).
2. During playback, short pins ② and ⑦ of CN1003 on MA7 board for a moment (approx. 0.5 sec).
3. Check LED blinking.
4. Press EJECT key one time for automatic adjustment.
5. Check if LED stopped blinking and the adjustment completed. Eject the alignment tape.

#### 2-3. Set-up for adjustment

The video signal from the pattern generator is used as adjustment signal for electrical adjustment. This video signal should meet the requirement. Connect the oscilloscope to the video input terminal on the MF 1 board and make sure that the amplitudes of sync signal of video signal, video portion and burst signal are flat at approximately 0.3, 0.7 and 0.3 V, respectively, and that the level ratio of the burst signal and "red signal" are 0.30 : 0.66, Fig. 2-2. shows video signals (color bars) used in adjusting the electrical adjustment.

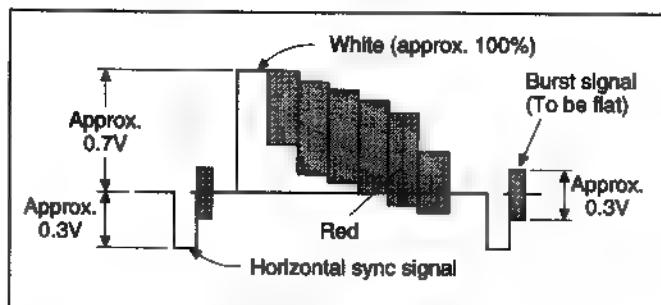


Fig. 2-2

#### Alignment Tape (MH-2)

	Time	Video signal	Audio signal
1	10 minutes	Starir-step	6 kHz
2	5 minutes	—	3 kHz
3	10 minutes	Color bar	1 kHz
4	3 minutes	RF sweep	—

#### 2-4. Specified Input/Output Level Impedance Input/Output terminal

Video input	Pin jack	Input signal : 1Vp-p, 75Ω, unbalanced
		Sync negative
VIDEO LINE OUT	Pin jack	Output signal : 1Vp-p, 75Ω, unbalanced
		Sync negative
AUDIO LINE IN	Pin jack	Input level : -7.5dBs (0dBs=0.775VRms)
		Input impedance : More than 47kΩ
AUDIO LINE OUT	Pin jack	Specified output : -7.5dBs At 47kΩ loaded. Load impedance : More than 10kΩ

### 3-1. SYSTEM CONTROL-VIDEO BLOCK INTERFACE (MA7 BOARD IC402)

Signal	Pin No.	I/O	STOP	FF	REW	TAPE THREADING	TAPE UNTHREADING	PB	PB- PAUSE	SLOW	X2	PICTURE SEARCH		REC	REC PAUSE
												CUE	REVIEW		
V-PB	IC402 ⑩	O	H	■	H	H	H	L	L	L	L	L	L	H	H
RF SW P (SW25)	IC402 ①	O	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1
Q VD/V MUTE	IC402 ④	O	L	L	L	L	L	*2	*3	*3	*3	*3	*3	L	L
NA-SP	IC402 ⑩	O	*4	*4	*4	*4	*4	*5	*5	*5	*5	*5	*5	*4	*4
LP	IC402 ⑬	O	*8	*8	*8	*8	*8	*5	*5	*5	*5	*5	*5	*8	*8
REC-P	IC402 ④	O	L	L	L	L	L	L	L	L	L	L	L	L	H
REC	IC402 ⑩	O	L	L	L	L	L	L	L	L	L	L	L	H	H
V SYNC	IC402 ⑩	I	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6
OSD MUTE	IC402 ⑩	O	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7
CTL REC	IC402 ⑩	O	L	L	L	L	L	L	L	L	L	L	L	H	L
NTSC	IC402 ⑤	O	L	L	L	L	L	L	L	L	L	L	L	L	L
JOG	IC402 ⑩	O	L	L	L	L	L	L	H	H	H	H	H	L	L
CRC SETTEI	IC402 ⑩	O	L	L	L	L	L	L	L	L	L	L	L	*9	*9

\*1. 25Hz 50% duty pulse synchronizing with drum rotation.

\*2. Normally "L". "H" when the video signal is not detected.

\*3. V period "H" pulse.

\*4. "L" in the SP mode. Selected according to the recording mode.

\*5. Selected according to the tape recording mode.

\*6. Composite sync signal (positive).

\*7. "H" when menu screen or gray back screen.

\*8. Selected by REC mode, "L" in the SP mode.

\*9. "H" while APC is set.

### 3-2. SYSTEM CONTROL-SERVO PERIPHERAL CIRCUIT INTERFACE (MA7 BOARD IC402)

Signal	Pin No.	I/O	STOP	FF	REW	TAPE THREADING	TAPE UNTHREADING	PB	PB PAUSE	SLOW	X2	PICTURE SEARCH		REC	REC PAUSE	PB INDEX WRT/ERS
												CUE	REVIEW			
REC CTL	IC402 ⑦	O	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	
CAP STOP	IC402 ⑧	O (O.D.)	L	HI-Z (O.D.)	HI-Z (O.D.)	HI-Z (O.D.)	HI-Z (O.D.)	HI-Z (O.D.)	L	*3	HI-Z (O.D.)	HI-Z (O.D.)	HI-Z (O.D.)	HI-Z (O.D.)	HI-Z (O.D.)	
STEP PLS	IC402 ⑨	O	L	L	L	L	L	L	L	*2	L	L	L	L	L	
CTL REC	IC402 ⑩	O	L	L	L	L	L	L	L	L	L	L	L	H	L	H
CTL INDEX	IC402 ⑪	O	L	L	L	L	L	L	L	L	L	L	L	L	L	H
PB CTL	IC402 ⑫	I	■	*6	*6				*1	H/L	*2	*6	*6	*1	H	
DRUM PG	IC402 ⑬	I	*4	*7	*7	*5	*5	*7	*7	*7	*7	*7	*7	*7	*7	
DRUM FG	IC402 ⑭	I	*4	*8	*8	*5	*5	*8	*8	*8	*8	*8	*8	*8	*8	
CAP FG	IC402 ⑮	I	H/L	*6	*6	*5	*5	*6	H/L	*9	*6	*6	*6	*6	H/L	
CAP DA	IC402 ⑯	O	*10	*10	*10	*10	*10	*11	*10	*10	*11	*11	*11	*11	*10	
DRUM DA	IC402 ⑰	O	*12	*12	*12	*12	*12	*12	*12	*12	*12	*12	*12	*12	*12	
CTL STEP	IC402 ⑱	O	L	L	L	L	L	L	L	*13	L	L	L	L	L	

\*1. 25Hz pulse.

\*2. Pulse in tape running.

\*3. Reverse logic pulse of STEP PLS.

\*4. "L" when drum rotation stops.

\*5. Unstable period pulse.

\*6. Pulse of period proportionate to tape speed.

\*7. 25Hz pulse.

\*8. 300Hz pulse.

\*9. Pulse in tape running.

\*10. Approx. 2 msec. period "H" or "L" pulse.

\*11. Approx. 1.5 msec. period "H" or "L" pulse.

\*12. Approx. 3 msec. period "H" or "L" pulse.

\*13. "H" in FWD direction and STEP drive.

### 3-3. SYSTEM CONTROL-MECHANISM BLOCK INTERFACE (MA7 BOARD IC402)

Signal	Pin No.	I/O	CASSETTE		TAPE		STOP		FF	REW	PB	PB-PAUSE	SLOW	X2	PICTURE SEARCH		REC	REC-PAUSE
			EJECTED	LOADING	UNLOADING	THREADING	UNTHREADING	STOP							CUE	REVIEW		
CAM LOAD	IC402 ⑬	O	L	H	L	H	L	L	L	L	L	L	L	L	L	L	L	L
CAM UNLOAD	IC402 ⑭	O	L	L	H	L	H	L	L	L	L	L	L	L	L	L	L	L
CAM 12V	IC402 ⑮	O		H	L	H	L											
MODE 1	IC402 ⑯	I	H	L	L	*1	*1	H	H	H	H	H	H	H	H	L	H	H
MODE 2	IC402 ⑰	I	L	L	L	*1	*1	L	L	L	H	H	H	H	H	H	H	H
MODE 3	IC402 ⑱	I	L	L	L	*1	*1	H	H	H	L	H	H	L	L	H	L	H
MODE 4	IC402 ⑲	I	L	II	II	*1	*1	H	L	L	L	L	L	L	L	L	L	L
REC PRF	IC402 ⑳	I	L	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2
T REEL FG	IC402 ㉑	I	H/L	H/L	H/L	H/L	H/L	H/L	*3	*3	H/L	*3	*3	*3	*3	*3	H/L	
S REEL FG	IC402 ㉒	I	H/L	H/L	H/L	*3	*3	H/L	*3	*3	H/L	*3	*3	*3	*3	*3	H/L	
T/Y LED	IC402 ㉓	O (O.D.)	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4
CAP TRQ 1	IC402 ㉔	O (O.D.)																
CAP TRQ 2	IC402 ㉕	O (O.D.)											L	*1				L
CAP TRQ 3	IC402 ㉖	O (O.D.)							H	II						H	H	
CAP STOP	IC402 ㉗	O (O.D.)	L	L	L	H	H	L	H	H	H	L	*5	H	H	H	H	L
CAP RVS	IC402 ㉘	O	H			L	H	H/L	L	II	L	L	L <sup>6</sup>	L	L	H	L	L
CAP DA	IC402 ㉙	O																
T SENS	IC402 ㉚	I	*4	*4	*4	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7
S SENS	IC402 ㉛	I	*4	*4	*4	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7

\*1. Uncertainty

\*2. "L" when the erasing protection tab is bent, "H" when not bent.

\*3. Pulse of period proportionate to reel rotation speed.

\*4. Approx. 2 msec. period "H" pulse.

\*5. Pulse in tape running.

\*6. "L" only in tape running and when CAP RVS is "H".

\*7. Normally "L". 2 msec. period "H" pulse when tape top or tape end is detected.

### 3-4. SYSTEM CONTROL-SYSTEM CONTROL PERIPHERAL CIRCUIT INTERFACE (MA7 BOARD IC402)

Signal	Pin No.	I/O	I/O Level											
ASURA RESET	IC402 ⑩	I	Normally "H", "L" when service interruption is detected or restored.											
ASURA CS	IC402 ⑪	I	Chip select signal from the timer microprocessor. V period "L" pulse.											
S IN 0	IC402 ⑫	I	Serial communication data from the timer microprocessor. V period "L" pulse.											
S OUT 0	IC402 ⑬	O	Serial communication data to the timer microprocessor. V period "L" pulse.											
S CLK	IC402 ⑭	I	Serial communication clock with the timer microprocessor. V period "L" pulse.											

### 3-5. SYSTEM CONTROL-AUDIO BLOCK INTERFACE (MA7 BOARD IC402)

Signal	Pin No.	I/O	STOP	FF	REW	TAPE THREADING	TAPE UNTHREADING	PB	PB PAUSE	SLOW	X2	PICTURE SEARCH		REC	REC PAUSE
												CUE	REVIEW		
AF ENVELOP	IC402 ⑮	I	AF RF envelope signal input pin for auto tracking.												
NA PB	IC402 ⑯	O	L	L	L	L	L	H	H	H	H	H	H	L	L
A MUTE	IC402 ⑰	O (O.D)	L	L	L	L	L	*1	H	H	H	H	H	L	L
NA SP	IC402 ⑱	O	*2	*2	*2	*2	*2	*3	*3	*3	*3	*3	*2	*2	*2
NA REC. P	IC402 ⑲	O	L	L	L	L	L	L	L	L	L	L	L	H	L
AF REC. P	IC402 ⑳	O	L	L	L	L	L	L	L	L	L	L	L	H	L
AF SWP	IC402 ㉑	O	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1
AF SW POSITION	IC402 ㉒	I	Input pin for AF switching position adjustment.												
FULL ERS	IC402 ㉓	O (O.D)	H	H	H	H	H	H	H	H	H	H	H	L	H

\*1. 2.5Hz 50% duty pulse approximately 5 msec. delayed from RF SW P.

\*2. Selected according to SP/LP selector. "L" in the SP mode, "H" in the LP mode.

\*3. Selected according to the tape recording mode. "L" in the SP mode, "H" in the LP mode.

\*4. Not used.

### 3-6. SYSTEM CONTROL-RF MODULATOR, INPUT SELECTION BLOCK INTERFACE (MA7 BOARD IC402)

Signal	Pin No.	I/O	I/O Level		
			TUNER	LINE 1	LINE 2
LINE 1	IC402 ㉔	O	L	H	L
LINE 2	IC402 ㉕	O	L	L	H

\*1. Not used.

### 3-7. SERVO/SYSTEM CONTROL MICROPROCESSOR (MA7 BOARD IC402) PORT FUNCTION DESCRIPTION

Pin No.	Signal	I/O	Function
1	RF SWP	O	RF switching pulse.
2	QVD	O	False VD.
3	QHD ENBL	O	False HD voltage level control.
4	AF REC P	O	Hi-Fi recording control. (Not used. (open))
5	NTSC	O	H : PAL.
6	FE ON	O	Flying erase. (Not used. (open))
7	REC CTL	I/O	REC CTL.
8	CAP TRQ3	O	Capstan current control.
9	APC2	O	
10	APC1	I/O	
11	NA REC P	I/O	Normal audio recording mode. H : recording mode.
12	SP EP/LP	O	Tape speed control.
13	CAM LOAD	I/O	Loading motor rotating direction control.
14	CAM UNLOAD	I/O	Loading motor rotating direction control.
15	C IN(REC PRF)	O	Cassette IN and erasing protection (ad detection switch input).
16	RENTAL	I/O	H : poor tape.
17	SECAM	O	H : SECAM (Not used. (open))
18	PAL SP	O	H : PAL (Not used. (open))
19	3.58 NTSC	O	Tuner, audio selection signal. ■ : 3.58 XTAL. (Not used. (open))
20	NT JUDGE	I	4.43/3.58 judge input. (Not used. (open))
21	BLUE BACK ON	I/O	H : ME SECAM (Not used. (open))
22	PAL 60	O	H : HTSC on PAL TV. (Not used. (open))
23	TV VTR	O	Not used. (open)
24	AV CONT	O	ON/OFF control. (Not used. (open))
25	C+CONT	O	CANAL + control. (Not used. (open))
26	BIL	O	H output : BS bilingual mode. (Not used. (open))
27	MODE 4	I	Cam encoder data 4.
28	MODE 3	I	Cam encoder data 3.
29	MODE 2	I	Cam encoder data 2.
30	MODE 1	I	Cam encoder data 1.
31	CAM 12V	O	CAM motor voltage change.
32	TYP LED	O	Top/end detection lamp lighting control.
33	CAP TRQ 2	O	Capstan current control signal 2. L : FF/REW to STOP.
34	CAP TRQ 1	O	Capstan current control signal 1. L : SLOW speed down.

Pin No.	Signal	I/O	Function
35	CAP STOP	O	Capstan stop reversal. L : Capstan stop.
36	FULL ERS	O	Full erase control. (Not used. (GND))
37	N.C.		GND.
38	N.C.		GND.
39	MP	I	Fixed to L.
40	ASURA RESET	I	System reset input.
41	VSS		GND.
42	XTAL	I	System clock 16MHz.
43	EXTAL	O	System clock 16MHz.
44	ASURA CS	I	Chip select signal.
45	S IN 0	I	Serial communication signal.
46	S OUT 0	O	Serial communication signal.
47	S CLK	I	Serial clock input.
48	NICOLE ON	O	Not used. (open)
49	F MONO C	O	Not used. (open)
50	EDIT	O	EDIT control. (Not used. (open))
51	TRINITRON	I	GND.
52	A VSS	I	GND.
53	A VREF	I	AD port reference input. (UNSW 5V)
54	A VDD	I	UNSW 5V.
55	APC ERROR	I	AD input for APC 2.
56	NT PB SW	I	GND.
57	DEST 2 (DEW)	I	Destination judge input. Fixed to L.
58	DEST 1	I	Destination judge input.
59	AF ENV	I	Hi-Fi audio playback signal envelope.
60	RF ENV	I	Video playback signal envelope.
61	T SENS	I	Tape top sensor input.
62	S SENS	I	Tape end sensor input.
63	S REEL FG	I	S side reel FG input.
64	T REEL FG	I	T side reel FG input.
65	N.C.		Not used. (open)
66	V SYNC	I	Composite sync input.
67	PB CTL	I	Servo CTL input.
68	DRM PG	I	Drum PG input.

Pin No.	Signal	I/O	Function
69	DRM FG	I	Drum FG input.
70	CAP FG	I	Capstan FG input.
71	N.C.	O	Not used. (open)
72	CAP RVS	O	Capstan reverse control. H : Reverse.
73	CAP DA	O	Capstan D/A output.
74	DRM DA	O	Drum D/A output.
75	CTL REC	O	H : CTL write.
76	CTL STEP	O	"CTL amp, STEP operation control."
77	N.C.		Not used. (open)
78	N.C.		Not used. (open)
79	CTL INDEX	O	Index control signal rewrite. H : Erase.
80	SO 1	I/O	Expanded port data.
81	SCK 1	I/O	Expanded port clock.
82	LINE 2	O	Input selection control signal. (Not used. (open))
83	LINE 1	O	Input selection control signal. (Not used. (open))
84	APC PW	O	PWM output for APC2. (Not used. (open))
85	N.C.		Not used. (open)
86	N.C.		Not used. (open)
87	N.C.		Not used. (open)
88	VSS		GND.
89	VDD		UNSW 5V.
90	N.C.		UNSW 5V.
91	ORC SETTEI	O	H : ORC measure.
92	A MUTE	O	Audio mute. H : mute.
93	SP	O	L : SP mode.
94	NA SP	O	For normal audio. L : SP mode.
95	NAPB	O	Audio output control signal. H : Normal audio playback.
96	AF REC		Not used. (open)
97	JOG	O	H : JOG
98	V PB	O	Video system playback mode reversal. L : Playback.
99	STEP PLS	O	"Step pulse, H : Capstan step driving."
100	AF SWP	O	AF switching pulse. (Not used. (open))

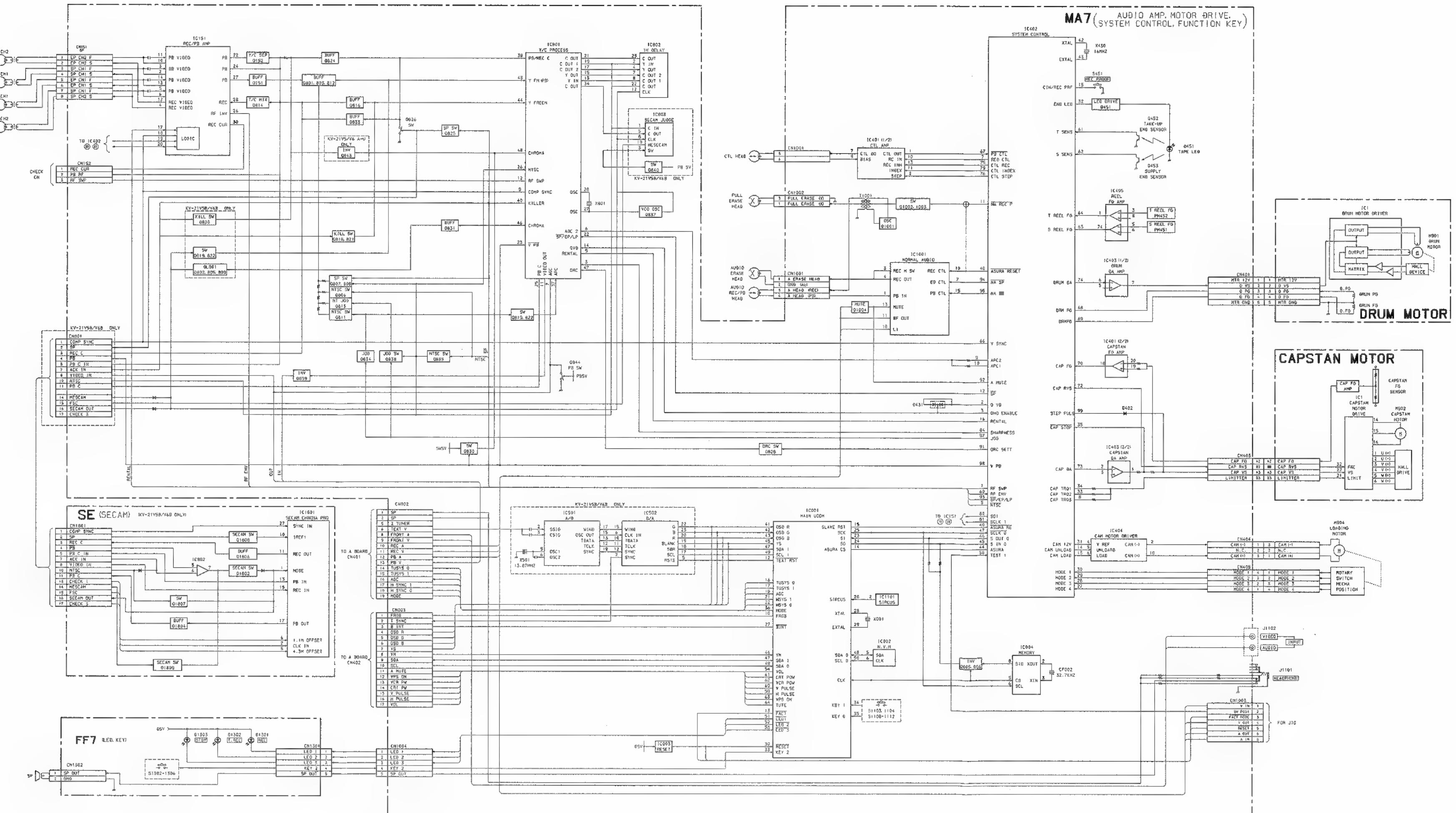
\*1. Selected by tape condition.

tape signal	good	normal	poor
RENTAL ⑩	L	L	H

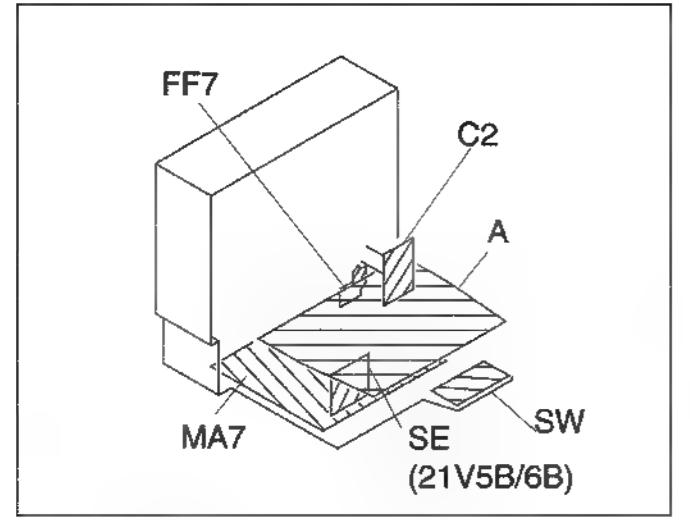
## VTR SECTION

### SECTION 4 DIAGRAMS

#### 4-1. BLOCK DIAGRAM



## 4-2. CIRCUIT BOARDS LOCATION



#### **4-3. PRINTED WRING BOARDS AND SCHEMATIC DIAGRAMS**

**Note:**

- Capacitors are with out voltage indication are all 50V.
- All electrolytics are in 50V unless otherwise specified.
- All resistors are in ohms.  
 $k\Omega=1000\Omega$ ,  $M\Omega=1000k\Omega$
- Indication of resistance, which dose not have one for rating electrical power, is as follows.
 

Pitch : 5mm
Rating electrical power : $1/4W$
-  : nonflammable resistor.
-  : fusible resistor.
- $\Delta$  : internal component.
-  : panel designation and adjustment for repair.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- As to the voltage value shown by the semiconductors on the Shematic Diagram, see the another list
- Readings are taken with  color-bar signal input.
- Readings are taken with  10MΩ digital multimeter.
- Voltages are dc with respect to ground unless otherwise noted.
- Voltage variations may be noted due to normal production tolerances.
- All voltages are in V.
  - \* : Measurement impossibility.
-  : B+line.
-  : B-line.

(Actual measured value may be different).

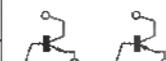
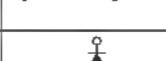
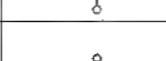
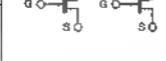
-  : signal path. (RF)
- Circled numbers are waveform references.
- Measurement mode.
  - mo mark : REC/PB mode
  - ( ) : REC mode
  - < > : PB mode

		NONFLAMMABLE METAL OXIDE
		NONFLAMMABLE CEMENT
		ADJUSTMENT RESISTOR
L	LF-8L	MICRO INDUCTOR
PACITOR	TA	TANTALUM
	PS	STYROL
	PP	POLYPROPYLENE
	PT	MYLAR
	MPS	METALIZED POLYESTER
	MPP	METALIZED POLYPROPYLENE
	ALB	BIPOLAR
	ALT	HIGH TEMPERATURE
	ALR	HIGH RIPPLE

**Note: The components identified by shading and mark  are critical for safety. Replace only with part number specified.**

Note: Les composants identifiés par un trame et une marque  sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

terminal name of semiconductors in silk screen  
printed circuit ( \* )

Device	Printed symbol	Terminal name	Circuit
Transistor	T	Collector Base Emitter	
Transistor	—	Collector Base Emitter	
Diode	□	Cathode Anode	
Diode	T	Cathode Anode (NC)	
Diode	—	Cathode Anode (NC)	
Diode	T	Common Anode Cathode	
Diode	—	Common Anode Cathode	
Diode	T	Common Anode Anode	
Diode	—	Common Anode Anode	
Diode	T	Common Cathode Cathode	
Diode	—	Common Cathode Cathode	
Transistor (FET)		Source Gate	
Transistor (FET)	T	Source Gate	
Transistor (FET)		Source Drain Gate	
Transistor		Emitter Collector Base	

and communications with the relevant local law enforcement agencies;

# MA7 (1/3) [ AUDIO AMP, MOTOR DRIVE, SYSTEM CONTROL, FUNCTION KEY ] MA7

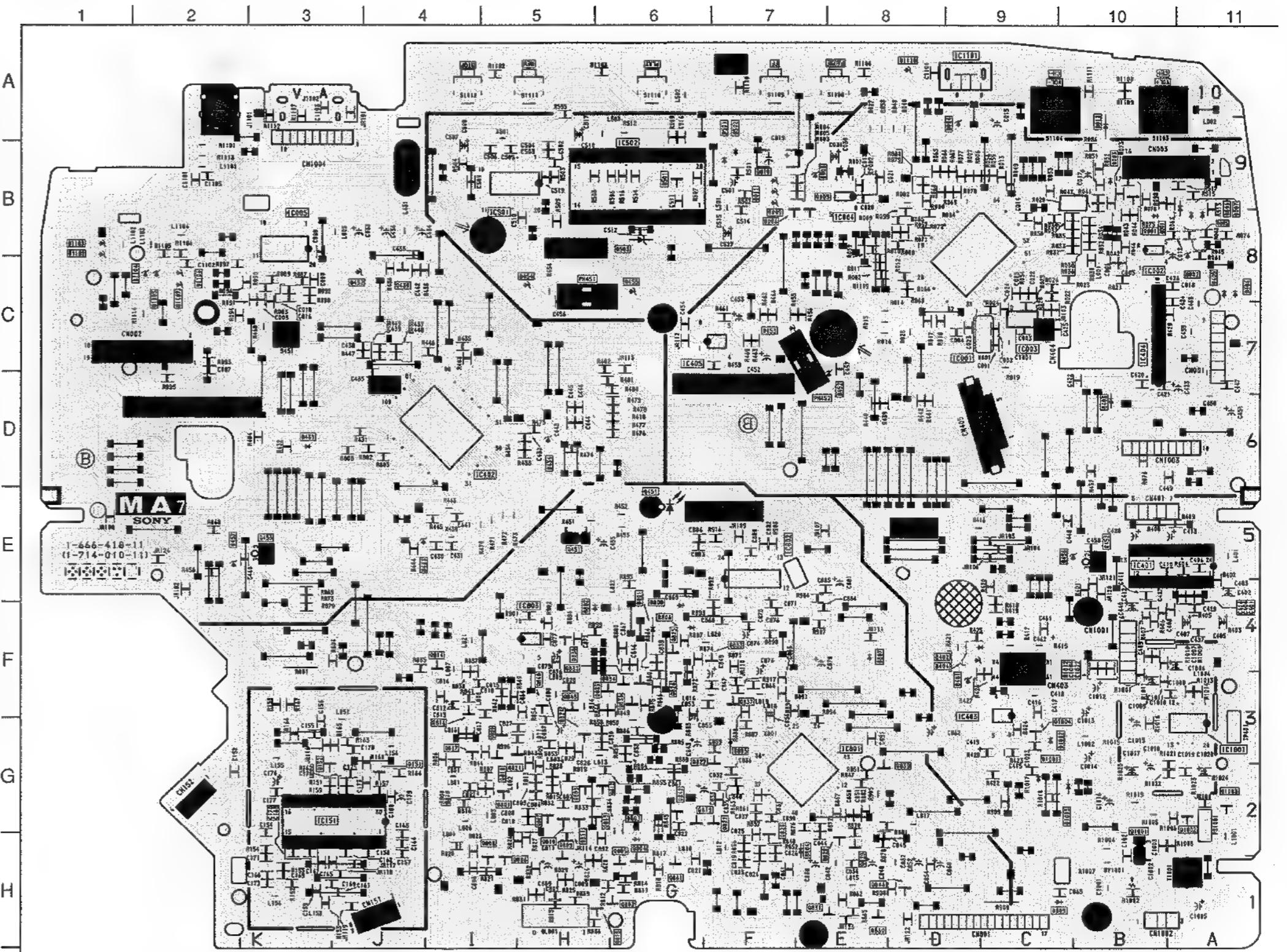
7 (2/3) [ Y/C PROCESSOR ] MA

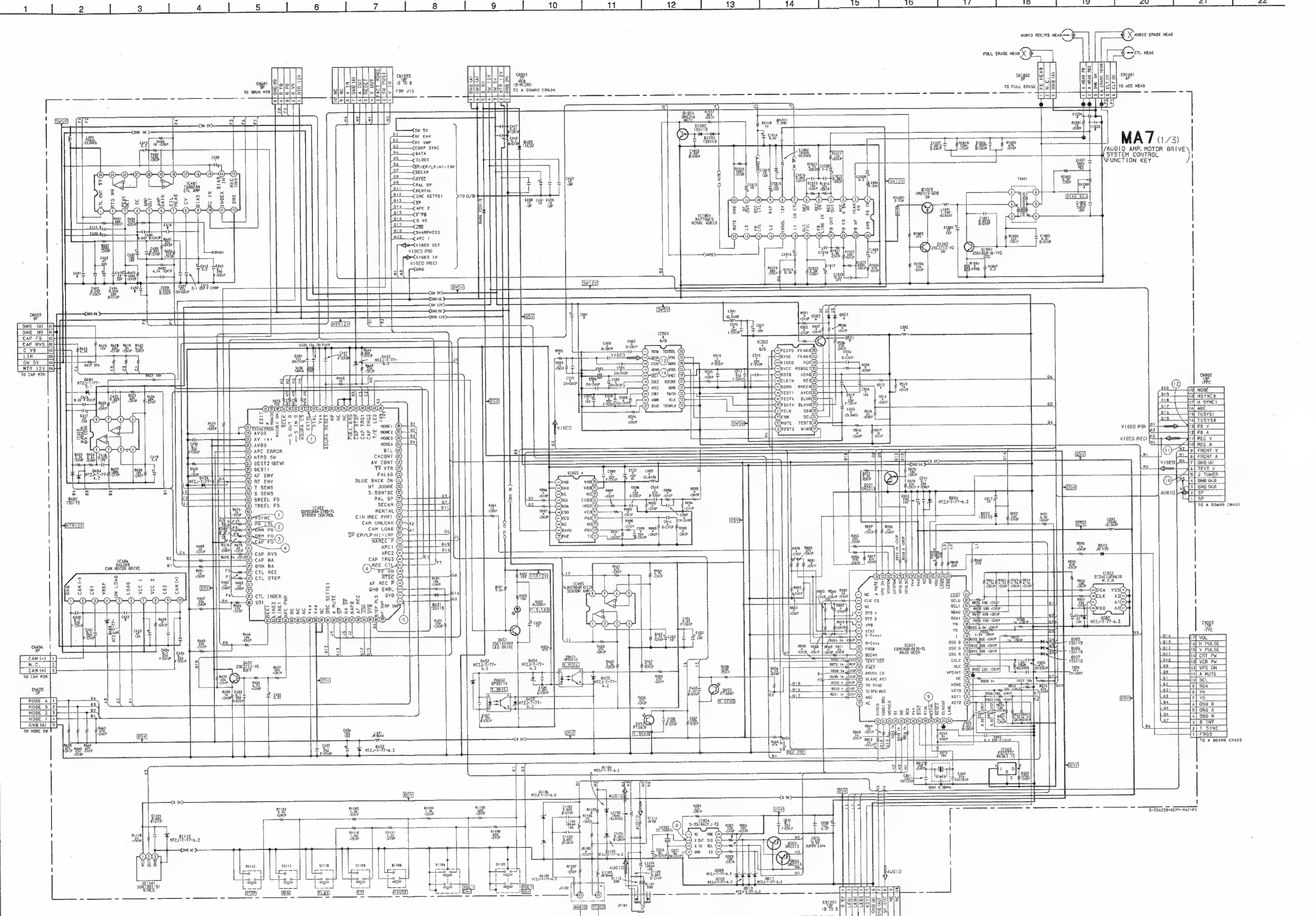
7 (3/3) [ HEAD AMP ]

**– MA7 BOARD –**

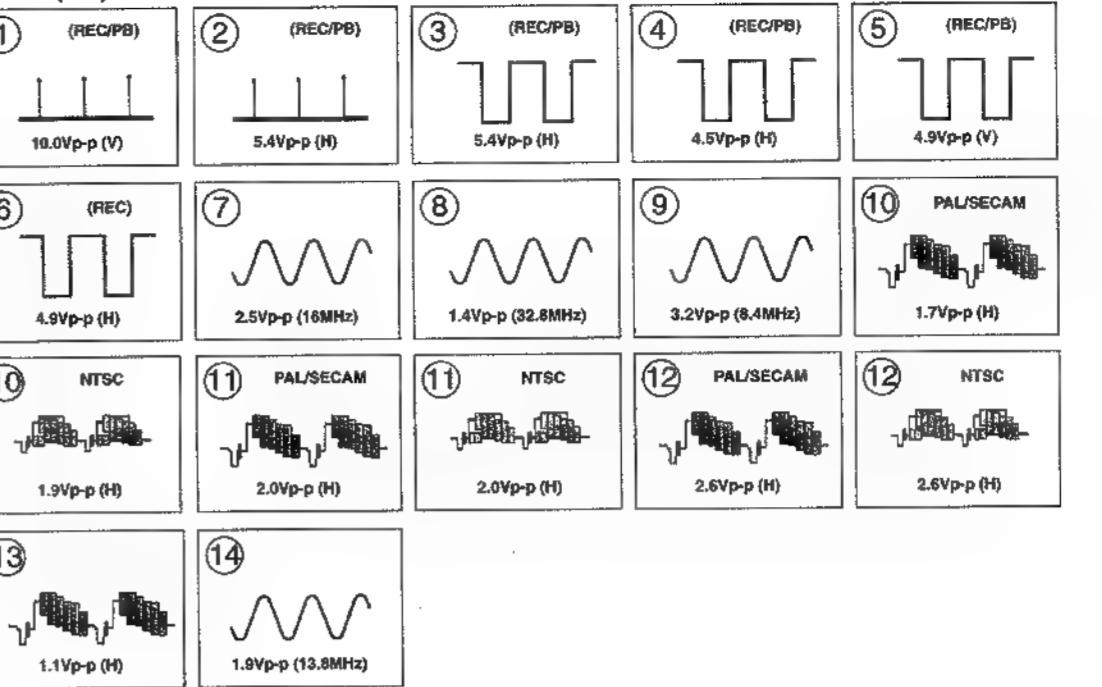
## BOARD

E	*	IC1101	A-9	*
C-11		TRANSISTOR		*
B-10		Q001	B-10	④
A-9		Q005	B-7	①
B-11		Q006	B-7	①
B-11		Q151	G-4	③
B-11		Q152	G-3	①
B-7		Q430	C-4	①
B-7		Q451	E-5	-
B-7		Q452	E-10	①
B-7		Q453	E-3	-
H-9		Q501	B-6	①
F-9		Q801	G-4	①
D-10		Q802	H-6	①
F-9		Q803	G-5	①
C-11		Q804	H-6	①
C-11		Q805	H-5	①
D-3		Q806	H-5	①
C-3		Q807	H-4	①
E-4		Q808	G-5	①
D-5		Q809	H-5	①
E-6		Q810	H-4	①
D-8		Q811	G-4	①
C-7		Q812	G-6	①
C-5		Q813	G-4	①
C-5		Q814	F-4	①
B-7		Q815	H-5	①
B-7		Q816	F-4	①
F-5		Q818	G-4	①
F-5		Q819	G-5	①
H-6		Q820	G-5	①
G-8		Q821	G-4	①
H-7		Q822	H-5	①
F-6		Q824	G-5	①
F-8		Q825	F-5	①
F-6		Q826	G-6	①
G-9		Q827	H-8	①
G-9		Q828	H-8	①
A-8		Q829	G-8	①
		Q830	H-9	③
B-9		Q831	H-8	①
C-10		Q832	G-6	①
C-9		Q833	H-6	①
B-8		Q834	E-7	①
G-3		Q835	F-6	①
E-10		Q836	E-7	①
D-4		Q837	H-7	①
F-9		Q839	F-8	①
C-10		Q840	F-6	①
C-7		Q843	-5	③
B-5		Q844	H-8	①
B-6		Q1001	H-10	-
G-7		Q1002	G-11	①
F-7		Q1003	G-11	①
F-6		Q1004	G-9	①
C-11				





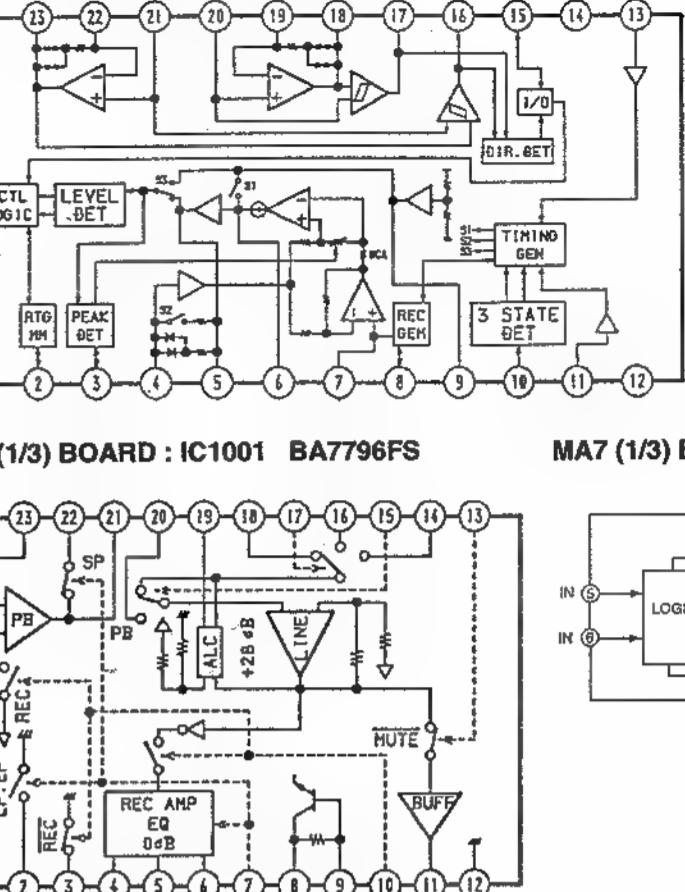
MA7 (1/3) BOARD WAVEFORMS



#### MAZ (1/2) BOARD IC VOLTAGE LIST

IC001										IC002										IC003										IC004										IC005										IC006										IC007																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
2	0.2	IC005	5	4.7	IC402	57	4.8	IC501	15	2.4	1	GND	40	4.8	IC1101	1	4.9	1	4.8	1	4.9	1	GND	41	4.8	PH451	1	1.3	1	GND	42	4.8	P11452	1	1.3	2	GND	43	4.8	2	4.9	2	GND	44	4.4	3	GND	3	0	3	GND	45	2.6	4	GND	4	*	4	GND	46	2.5	5	4.8	5	4.8	5	GND	47	2.8	6	4.8	6	0	6	GND	48	4.8	7	0	7	0	7	GND	49	4.8	8	GND	8	4.9	8	GND	50	4.8	9	4.9	9	4.9	9	GND	51	4.9	10	0	10	0	10	GND	52	4.8	11	1.4	11	0.3	11	GND	53	4.8	12	4.7	12	4.7	12	GND	54	4.8	13	4.9	13	4.9	13	GND	55	4.8	14	4.9	14	4.9	14	GND	56	4.8	15	4.9	15	4.9	15	GND	57	4.8	16	0	16	0	16	GND	58	4.8	17	0.9	17	0.9	17	GND	59	4.8	18	4.8	18	4.8	18	GND	60	(0.4) <1.7>	19	4.8	19	4.5	19	GND	61	4.8	20	4.8	20	4.8	20	GND	62	4.8	21	1.1	21	1.1	21	GND	63	*	22	4.8	22	4.8	22	GND	64	*	23	4.9	23	4.9	23	GND	65	0.6	24	4.8	24	4.8	24	GND	66	0.6	25	4.8	25	4.8	25	GND	67	(4.8) <3.1>	26	2.4	26	2.4	26	GND	68	0.6	27	4.8	27	4.8	27	GND	69	2.6	28	4.8	28	4.8	28	GND	70	2.3	29	4.9	29	4.9	29	GND	72	0.2	30	4.8	30	4.8	30	GND	73	2.5	31	4.5	31	4.5	31	GND	74	2.5	32	4.8	32	4.8	32	GND	75	(4.8) <0>	33	4.8	33	4.8	33	GND	76	0	34	4.8	34	4.8	34	GND	77	0	35	4.8	35	4.8	35	GND	78	0	36	(3.3) <2.3>	36	4.8	36	GND	79	0	37	4.8	37	4.8	37	GND	80	4.5	38	4.8	38	4.8	38	GND	81	4.7	39	4.8	39	4.8	39	GND	82	(3.3) <4.0>	40	4.8	40	4.8	40	GND	83	0.2	41	4.8	41	4.8	41	GND	84	(0.2) <4.8>	42	4.8	42	4.8	42	GND	85	0.2	43	4.8	43	4.8	43	GND	86	(0.2) <4.8>	44	4.8	44	4.8	44	GND	87	0	45	4.8	45	4.8	45	GND	88	0	46	4.8	46	4.8	46	GND	89	0	47	4.8	47	4.8	47	GND	90	4.8	48	4.8	48	4.8	48	GND	91	0	49	4.8	49	4.8	49	GND	92	0.2	50	4.8	50	4.8	50	GND	93	0.2	51	4.8	51	4.8	51	GND	94	(0.2) <4.8>	52	4.8	52	4.8	52	GND	95	(0.2) <4.8>	53	4.8	53	4.8	53	GND	96	(4.8) <0.1>	54	4.8	54	4.8	54	GND	97	4.8	55	4.8	55	4.8	55	GND	98	(4.8) <0.1>	56	4.8	56	4.8	56	GND	99	0.2	57	4.8	57	4.8	57	GND	100	2.8	58	4.8	58	4.8	58	GND	101	2.5	59	4.8	59	4.8	59	GND	102	2.5	60	4.8	60	4.8	60	GND	103	2.5	61	4.8	61	4.8	61	GND	104	2.5	62	4.8	62	4.8	62	GND	105	2.5	63	4.8	63	4.8	63	GND	106	2.5	64	4.8	64	4.8	64	GND	107	2.5	65	4.8	65	4.8	65	GND	108	2.5	66	4.8	66	4.8	66	GND	109	2.5	67	4.8	67	4.8	67	GND	110	2.5	68	4.8	68	4.8	68	GND	111	2.5	69	4.8	69	4.8	69	GND	112	2.5	70	4.8	70	4.8	70	GND	113	2.5	71	4.8	71	4.8	71	GND	114	2.5	72	4.8	72	4.8	72	GND	115	2.5	73	4.8	73	4.8	73	GND	116	2.5	74	4.8	74	4.8	74	GND	117	2.5	75	4.8	75	4.8	75	GND	118	2.5	76	4.8	76	4.8	76	GND	119	2.5	77	4.8	77	4.8	77	GND	120	2.5	78	4.8	78	4.8	78	GND	121	2.5	79	4.8	79	4.8	79	GND	122	2.5	80	4.8	80	4.8	80	GND	123	2.5	81	4.8	81	4.8	81	GND	124	2.5	82	4.8	82	4.8	82	GND	125	2.5	83	4.8	83	4.8	83	GND	126	2.5	84	4.8	84	4.8	84	GND	127	2.5	85	4.8	85	4.8	85	GND	128	2.5	86	4.8	86	4.8	86	GND	129	2.5	87	4.8	87	4.8	87	GND	130	2.5	88	4.8	88	4.8	88	GND	131	2.5	89	4.8	89	4.8	89	GND	132	2.5	90	4.8	90	4.8	90	GND	133	2.5	91	4.8	91	4.8	91	GND	134	2.5	92	4.8	92	4.8	92	GND	135	2.5	93	4.8	93	4.8	93	GND	136	2.5	94	4.8	94	4.8	94	GND	137	2.5	95	4.8	95	4.8	95	GND	138	2.5	96	4.8	96	4.8	96	GND	139	2.5	97	4.8	97	4.8	97	GND	140	2.5	98	4.8	98	4.8	98	GND	141	2.5	99	4.8	99	4.8	99	GND	142	2.5	100	4.8	100	4.8	100	GND	143	2.5	101	4.8	101	4.8	101	GND	144	2.5	102	4.8	102	4.8	102	GND	145	2.5	103	4.8	103	4.8	103	GND	146	2.5	104	4.8	104	4.8	104	GND	147	2.5	105	4.8	105	4.8	105	GND	148	2.5	106	4.8	106	4.8	106	GND	149	2.5	107	4.8	107	4.8	107	GND	150	2.5	108	4.8	108	4.8	108	GND	151	2.5	109	4.8	109	4.8	109	GND	152	2.5	110	4.8	110	4.8	110	GND	153	2.5	111	4.8	111	4.8	111	GND	154	2.5	112	4.8	112	4.8	112	GND	155	2.5	113	4.8	113	4.8	113	GND	156	2.5	114	4.8	114	4.8	114	GND	157	2.5	115	4.8	115	4.8	115	GND	158	2.5	116	4.8	116	4.8	116	GND	159	2.5	117	4.8	117	4.8	117	GND	160	2.5	118	4.8	118	4.8	118	GND	161	2.5	119	4.8	119	4.8	119	GND	162	2.5	120	4.8	120	4.8	120	GND	163	2.5	121	4.8	121	4.8	121	GND	164	2.5	122	4.8	122	4.8	122	GND	165	2.5	123	4.8	123	4.8	123	GND	166	2.5	124	4.8	124	4.8	124	GND	167	2.5	125	4.8	125	4.8	125	GND	168	2.5	126	4.8	126	4.8	126	GND	169	2.5	127	4.8	127	4.8	127	GND	170	2.5	128	4.8	128	4.8	128	GND	171	2.5	129	4.8	129	4.8	129	GND	172	2.5	130	4.8	130	4.8	130	GND	173	2.5	131	4.8	131	4.8	131	GND	174	2.5	132	4.8	132	4.8	132	GND	175	2.5	133	4.8	133	4.8	133	GND	176	2.5	134	4.8	134	4.8	134	GND	177	2.5	135	4.8	135	4.8	135	GND	178	2.5	136	4.8	136	4.8	136	GND	179	2.5	137	4.8	137	4.8	137	GND	180	2.5	138	4.8	138	4.8	138	GND	181	2.5	139	4.8	139	4.8	139	GND	182	2.5	140	4.8	140	4.8	140	GND	183	2.5	141	4.8	141	4.8	141	GND	184	2.5	142	4.8	142	4.8	142	GND	185	2.5	143	4.8	143	4.8	143	GND	186	2.5	144	4.8	144	4.8	144	GND	187	2.5	145	4.8	145	4.8	145	GND	188	2.5	146	4.8	146	4.8	146	GND	189	2.5	147	4.8	147	4.8	147	GND	190	2.5	148	4.8	148	4.8	148	GND	191	2.5	149	4.8	149	4.8	149	GND	192	2.5	150	4.8	150	4.8	150	GND	193	2.5	151	4.8	151	4.8	151	GND	194	2.5	152	4.8	152	4.8	152	GND	195	2.5	153	4.8	153	4.8	153	GND	196	2.5	154	4.8	154	4.8	154	GND	197	2.5	155	4.8	155	4.8	155	GND	198	2.5	156	4.8	156	4.8	156	GND	199	2.5	157	4.8	157	4.8	157	GND	200	2.5	158	4.8	158	4.8	158	GND	201	2.5	159	4.8	159	4.8	159	GND	202	2.5	160	4.8	160	4.8	160	GND	203	2.5	161	4.8	161	4.8	161	GND	204	2.5	162	4.8	162	4.8	162	GND	205	2.5	163	4.8	163	4.8	163	GND	206	2.5	164	4.8	164	4.8	164	GND	207	2.5	165	4.8	165	4.8	165	GND	208	2.5	166	4.8	166	4.8	166	GND	209	2.5	167	4.8	167	4.8	167	GND	210	2.5	168	4.8	168	4.8	168	GND	211	2.5	169	4.8	169	4.8	169	GND	212	2.5	170	4.8	170	4.8	170	GND	213	2.5	171	4.8	171	4.8	171	GND	214	2.5	172	4.8	172	4.8	172	GND	215	2.5	173	4.8	173	4.8	173	GND	216	2.5	174	4.8	174	4.8	174	GND	217	2.5	175	4.8	175	4.8	175	GND	218	2.5	176	4.8	176	4.8	176	GND	219	2.5	177	4.8	177	4.8	177	GND	220	2.5	178	4.8	178	4.8	178	GND	221	2.5	179	4.8	179	4.8	179	GND	222	2.5	180	4.8	180	4.8	180	GND	223	2.5	181	4.8	181	4.8	181	GND	224	2.5	182	4.8	182	4.8	182	GND	225	2.5	183	4.8	183	4.8	183	GND	226	2.5	184	4.8	184	4.8	184	GND	227	2.5	185	4.8	185	4.8	185	GND	228	2.5	186	4.8	186	4.8	186	GND	229	2.5</

3) BOARD : IC401 TA8823N



MAZ (1/3) BOARD \* MABU

	KV-21V5A/21V5E/21V6A/21V6E	KV-21V5B/21V6B	KV-21V5D/21V6D	KV-21V5K	KV-21V5U/21V6U
C007	-	150p CH : CHIP	150p CH : CHIP	-	180p CH : CHIP
C008	-	0.047 25V B : CHIP	0.047 25V B : CHIP	-	0.047 25V B : CHIP
C009	-	0.033 25V B : CHIP	0.033 25V B : CHIP	-	0.033 25V B : CHIP
C010	-	0.033 25V B : CHIP	0.033 25V B : CHIP	-	0.033 25V B : CHIP
C016	-	0.0022 B : CHIP	0.0022 B : CHIP	-	0.0022 B : CHIP
C033	-	100 10V	100 10V	-	100 10V
C099	-	0.1 25V F : CHIP	0.1 25V F : CHIP	-	0.1 25V F : CHIP
C502	0.022 B : CHIP	0.022 B : CHIP	0.022 B : CHIP	-	0.022 B : CHIP
C503	0.022 B : CHIP	0.022 B : CHIP	0.022 B : CHIP	-	0.022 B : CHIP
C504	220p CH : CHIP	100p CH : CHIP	200p CH : CHIP	-	200p CH : CHIP
C505	15p CH : CHIP	15p CH : CHIP	15p CH : CHIP	-	15p CH : CHIP
C506	15p CH : CHIP	15p CH : CHIP	15p CH : CHIP	-	15p CH : CHIP
C507	100 10V	100 10V	100 10V	-	100 10V
C508	0.1 25V F : CHIP	0.1 25V F : CHIP	0.1 25V F : CHIP	-	0.1 25V F : CHIP
C509	220p CH : CHIP	220p CH : CHIP	220p CH : CHIP	-	220p CH : CHIP
C510	0.1 25V F : CHIP	0.1 25V F : CHIP	0.1 25V F : CHIP	-	0.1 25V F : CHIP
C512	0.1 25V F : CHIP	0.1 25V F : CHIP	0.1 25V F : CHIP	-	0.1 25V F : CHIP
C515	0.1 25V F : CHIP	0.1 25V F : CHIP	0.1 25V F : CHIP	-	0.1 25V F : CHIP
C516	0.01 B : CHIP	0.01 B : CHIP	0.01 B : CHIP	-	0.01 B : CHIP
C517	0.1 25V F : CHIP	0.1 25V F : CHIP	0.1 25V F : CHIP	-	0.1 25V F : CHIP
C518	100 10V	100 10V	100 10V	-	100 10V
C519	15p CH : CHIP	75p CH : CHIP	15p CH : CHIP	-	15p CH : CHIP
C527	100 10V	100 10V	100 10V	-	100 10V
D501	ISS119	ISS119	ISS119	-	ISS119
D502	ISS119	ISS119	ISS119	-	ISS119
IC005	-	SDA5649X	SDA5649X	-	SDA5649X
IC501	CF72416DW	CF72416DW	CF72416DW	-	CF72416DW
IC502	CF70204NW	CF70204NW	CF70204NW	-	CF70204NW
L003	-	10µH : EL0405	10µH : EL0405	-	10µH : EL0405
L501	10µH : EL0405	10µH : EL0405	10µH : EL0405	-	10µH : EL0405
L502	JW	JW	JW	-	JW
L503	10µH : EL0405	10µH : EL0405	10µH : EL0405	-	10µH : EL0405
Q501	2SC2712-YG	2SC2712-YG	2SC2712-YG	-	2SC2712-YG
R010	-	1k : CHIP	-	1k : CHIP	-
R059	-	1k : CHIP	-	1k : CHIP	-
R065	-	10k : CHIP	-	-	10k : CHIP
R066	-	10k : CHIP	-	10k : CHIP	-
R067	-	10k : CHIP	10k : CHIP	-	10k : CHIP
R068	10k : CHIP	-	10k : CHIP	10k : CHIP	-
R069	10k : CHIP	-	10k : CHIP	-	10k : CHIP
R070	10k : CHIP	-	-	10k : CHIP	-
R079	10k : CHIP	10k : CHIP	10k : CHIP	-	10k : CHIP
R081	10k : CHIP	10k : CHIP	10k : CHIP	-	10k : CHIP
R082	-	-	-	10k : CHIP	-
R083	-	6.8k : CHIP	6.8k : CHIP	-	6.8k : CHIP
R085	-	-	-	10k : CHIP	-
R087	-	100k : CHIP	100k : CHIP	-	100k : CHIP
R088	-	1.2M : CHIP	1.2M : CHIP	-	1.2M : CHIP
R089	-	100 : CHIP	100 : CHIP	-	100 : CHIP
R090	-	6.8k : CHIP	6.8k : CHIP	-	6.8k : CHIP
R091	-	1.2M : CHIP	1.2M : CHIP	-	1.2M : CHIP
R092	-	1M : CHIP	1M : CHIP	-	1M : CHIP
R093	-	2.2k : CHIP	2.2k : CHIP	-	2.2k : CHIP
R094	-	4.7k : CHIP	4.7k : CHIP	-	4.7k : CHIP
R095	-	4.7k : CHIP	4.7k : CHIP	-	4.7k : CHIP
R096	-	100 : CHIP	100 : CHIP	-	100 : CHIP
R097	-	100 : CHIP	100 : CHIP	-	100 : CHIP
R099	10k : CHIP	-	10k : CHIP	-	10k : CHIP
R501	10k : CHIP	10k : CHIP	10k : CHIP	-	10k : CHIP
R502	10k : CHIP	10k : CHIP	10k : CHIP	-	10k : CHIP
R504	1k : CHIP	1k : CHIP	1k : CHIP	-	1k : CHIP
R505	1k : CHIP	1k : CHIP	1k : CHIP	-	1k : CHIP
R507	100 : CHIP	100 : CHIP	100 : CHIP	-	100 : CHIP
R508	100 : CHIP	100 : CHIP	100 : CHIP	-	100 : CHIP
R509	15k : CHIP	15k : CHIP	15k : CHIP	-	15k : CHIP
R512	6.8k	6.8k	6.8k	-	6.8k
R514	6.8k : CHIP	6.8k : CHIP	6.8k : CHIP	-	6.8k : CHIP
R516	8.2k : CHIP	8.2k : CHIP	8.2k : CHIP	-	8.2k : CHIP
R555	1k : CHIP	1k : CHIP	1k : CHIP	-	1k : CHIP

MA7 (2/3) BOARD IC VOLTAGE LIST	
IC801	1 (2.3) <4.3>
	3 2.5
	5 1.5
	6 (2.1) <2.1>
	7 (2.3) <3.3>
	8 4.5
	9 0.6
	10 3.1
	12 2.7
	14 2.9
	15 0.1
	16 1.3
	17 2.2
	18 0.3
	19 2.6
	21 2.6
	22 4.9
	23 (4.3) <1.8>
	24 GND
	25 (0) <2.4>
	26 0.6
	27 4.0
	28 2.6
	30 2.1
	32 4.6
	34 0.5
	36 0.2
	37 2.6
	38 (2.3) <3.1>
	39 1.9
	40 (0) <0.3>
	41 (1.1) <1.5>
	42 GND
	43 (3.1) <3.7>

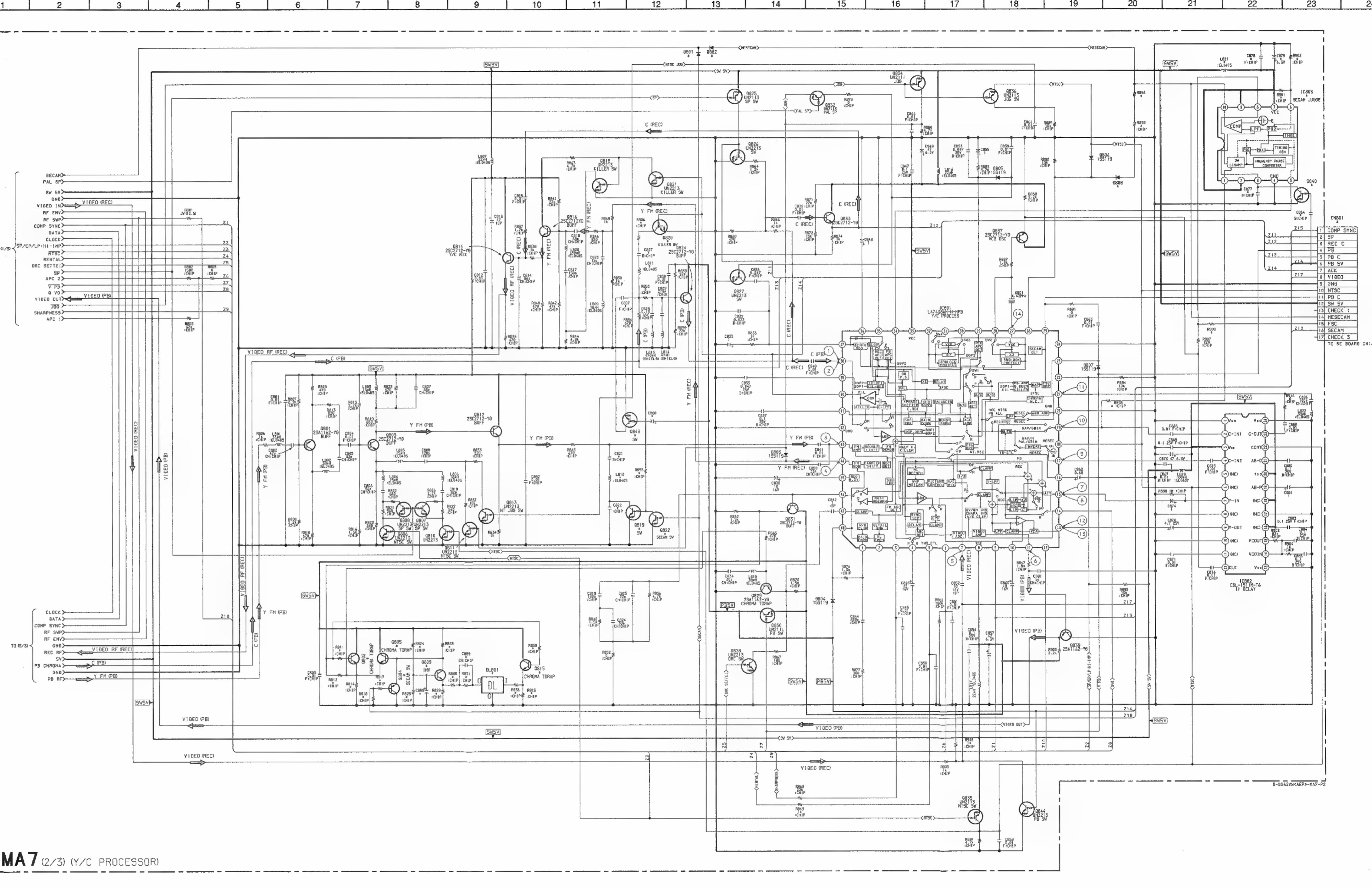
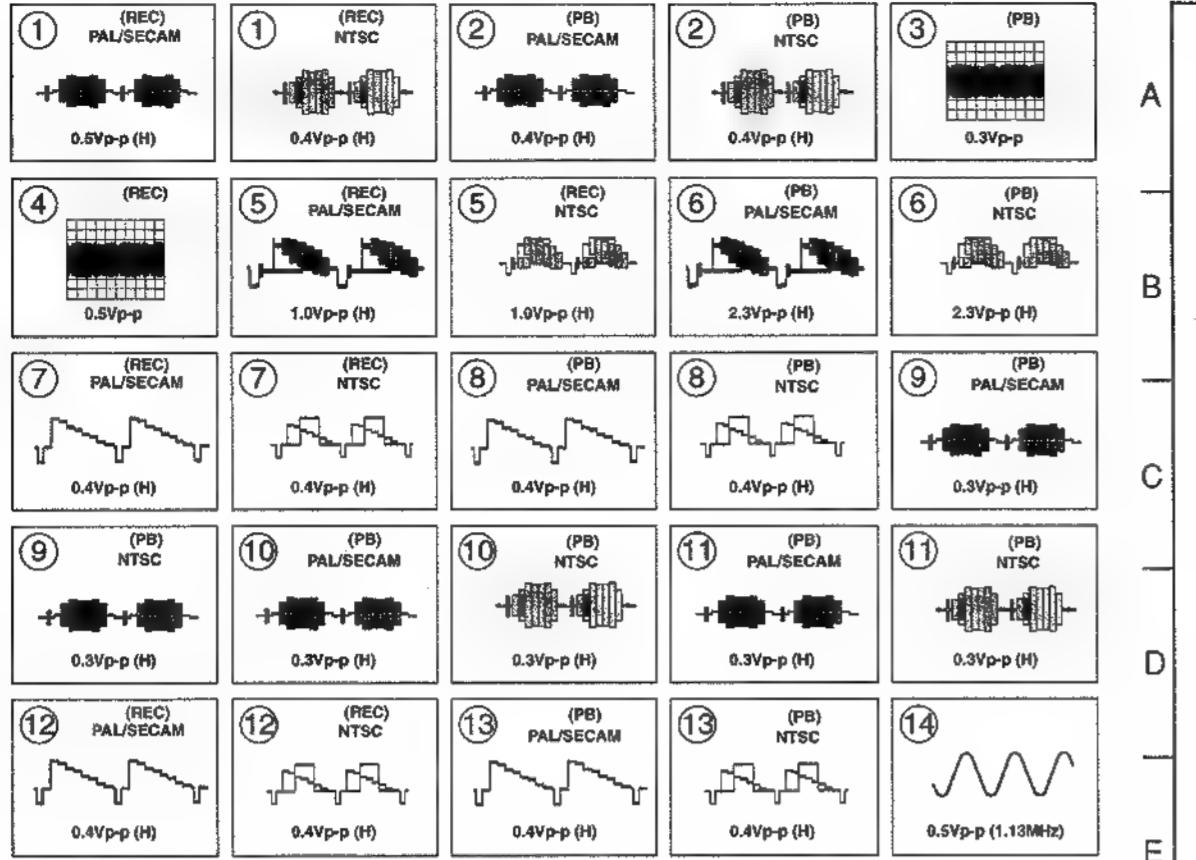
All voltages are in V.  
Pin numbers which are not described are not used.

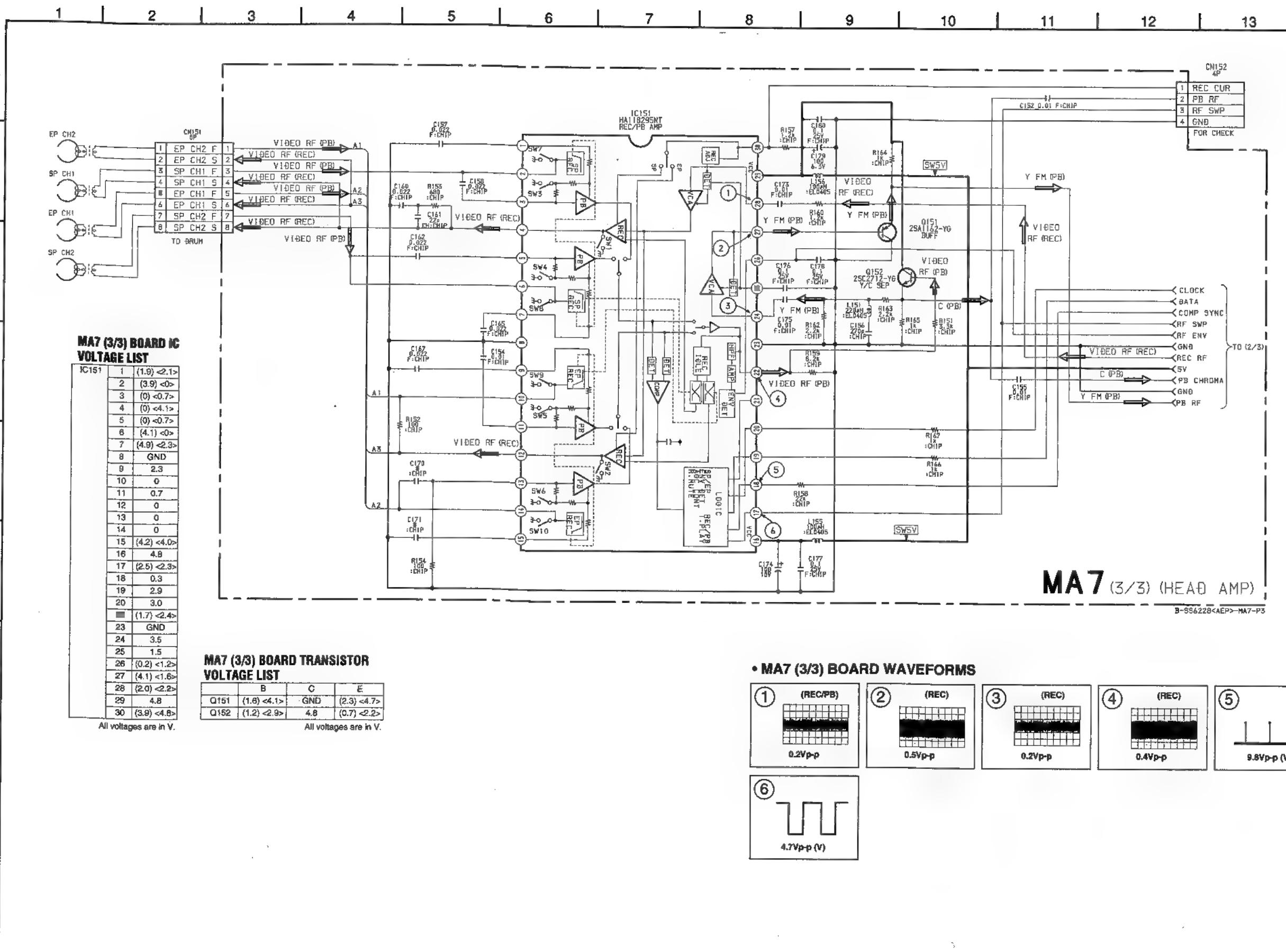
#### MA7 (2/3) BOARD TRANSISTOR VOLTAGE LIST

Q	8	C	E
Q801	8.1	1.7	2.5
Q802	(1.7) <2.1>	4.8	(1.1) <1.5>
Q803	1.7	2.7	1.1
Q804	0.9	GND	1.6
Q805	1.6	4.8	0.8
Q806	4.8	0	GND
Q807	0.0	0	0
Q808	6	1.8	0.9
Q810	1.3	0	GND
Q811	0.0	0.0	GND
Q812	2.5	4.8	1.9
Q813	0.0	0	3.1
Q814	2.5	4.8	1.8
Q815	(1.7) <2.1>	4.8	(1.1) <2.1>
Q816	2.9	4.8	0.5
Q817	0.0	0	GND
Q819	0.0	0	GND
Q820	0.3	0.0	GND
Q821	1.3	4	GND
Q822	0.3	0	GND
Q824	(0.2) <2.3>	(0.6) <4.8>	(0.3) <1.7>
Q825	0	4.8	GND
Q827	0	0	GND
Q828	0.2	(1.7) <2.1>	GND
Q829	(0.7) <1.5>	(1.1) <4.5>	(0.6) <0.5>
Q830	(0.6) <0.5>	(0.6) <4.5>	4.8
Q831	(2.5) <2.8>	4.8	(1.1) <2.1>
Q832	0	0	0
Q833	1.9	4.8	1.3
Q834	4.8	0.3	4.8
Q835	4.8	0.3	4.8
Q836	4.8	0	0.3
Q837	2.6	4.8	1.9
Q839	4.8	GND	GND
Q840	0	0.9	GND
Q841	0	0	0
Q844	(0) <4.8>	(3.4) <0>	GND

All voltages are in V.

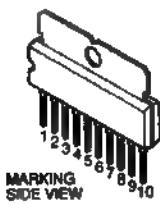
#### • MA7 (2/3) BOARD WAVEFORMS



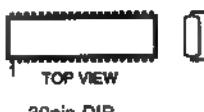


## 6-6. SEMICONDUCTORS

BA6209



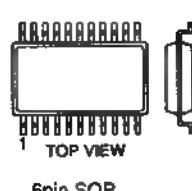
HA118295NT



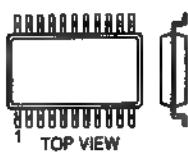
SBX1790-51  
SBX1981-51



TK11819MTL

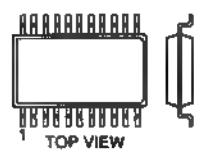


BA7796FS-E2  
CXL1511M-T6

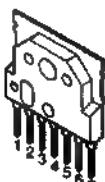


24pin SOP

LA7356M



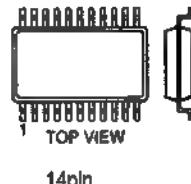
LA7840L



SE135N



U2860B-BFPG3

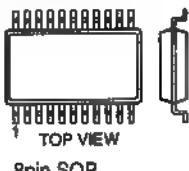


CF70204NW  
LA7337



28pin

NJM062M  
NJM2521M-TE1  
NJM2903M  
NJM2904M  
S-3510ACFJ-TB  
UPC393G2



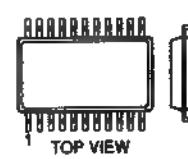
NJM78M09FA



STR-F6523



CF72416DW-R  
SDA5649X-GEG



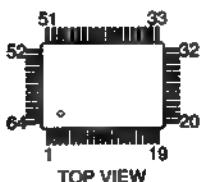
20pin

CXA1855Q  
LA7438AM-N-MPB



48pin QFP

CXA2076Q-TL  
CXP85460-063Q-TL



CXP87248A-038Q-TL



ST24C16FM6-TR



8pin DIP

TA8823N



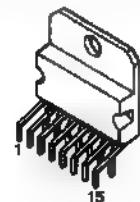
24pin DIP

TDA4665T-T



16pin DIP

TDA7494



TDA8395T/N3



20pin

DTA114TK  
DTA114TKA-T146

DTA144EKA-T146

DTA143EK

DTC143TK

DTC143TKA-T146

DTC144EKA-T146

UN211B

UN211I

UN2111L

UN2211

UN2213

UN2216

2SA1037AK-T146-R

2SA1162G

2SC1623-L5L6

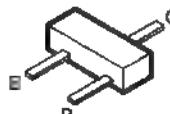
2SC2712-YG

2SC3052-EF

2SD601A-Q



DTC123YKA-T146



PT380F

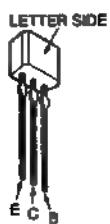


2SA1091-O  
2SC1815-GR

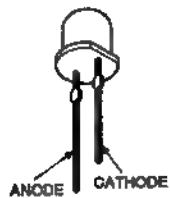


Schematic diagrams

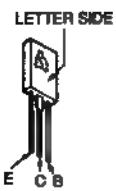
2SA1175-HFE  
2SD1858-Q-TV2



GL528V1



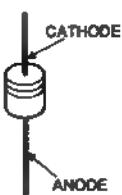
2SC2611



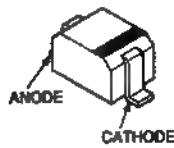
MTZJ-4.7

MTZJ-8.2B  
RB441Q  
RD4.7ESB2  
RD5.1ES-B1  
RD5.1ES-B2  
RD6.2ESB2  
RD6.8ES-B2  
RD9.1ES-B3  
RD9.1ES-L  
1SS119-25  
1SS133T-77  
11ES2

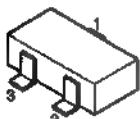
2SC4040-TL2-Q



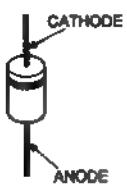
DTZ5.1B  
DTZ9.1



RD8.2M-B1



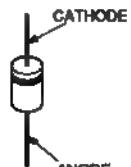
EGP20G  
EGP30D  
EL1Z  
ERC81-004L2Z  
ERD28-08S  
MTZJ-T-77-9.1A  
RMG06D



RG4C



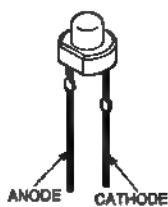
ERC06-15S



S1WB60



SLR-325VCT31



D3SB60F

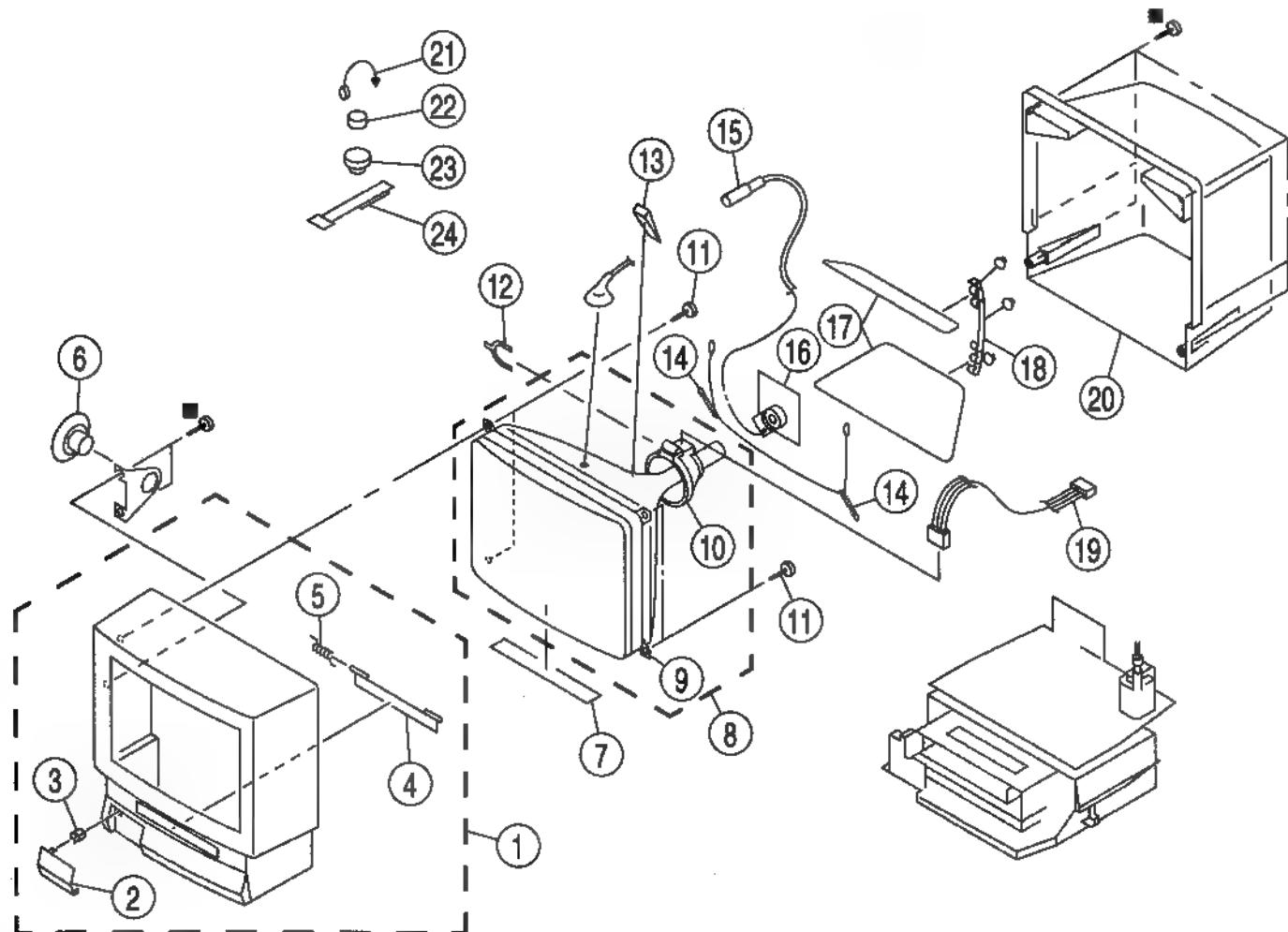


## 5-1. PICTURE TUBE

anticipated when ordering these items.

piece portant le numero specifie.

■ : 7-685-663-71 +BVTP 4X16

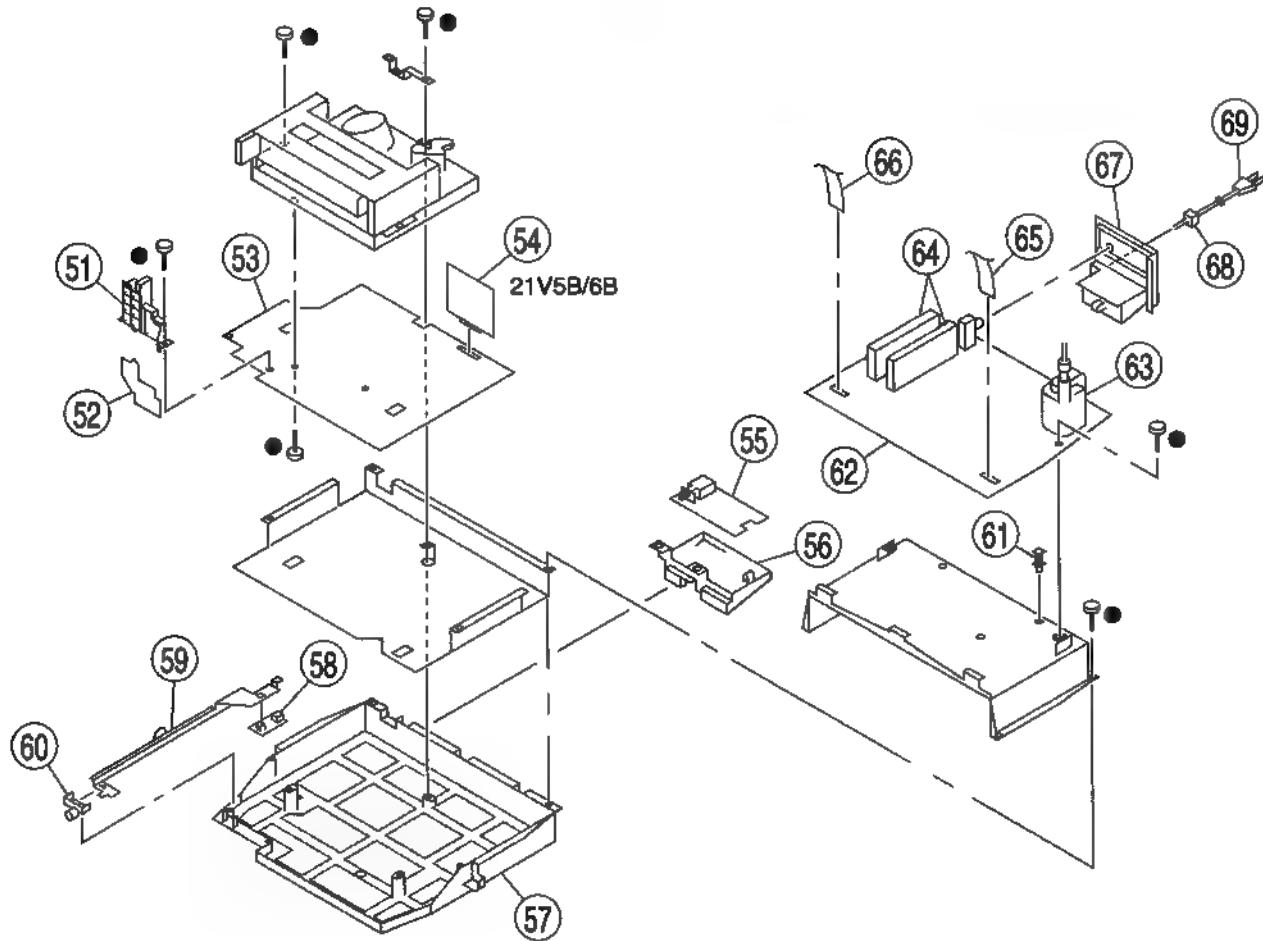


## 5-2. CHASSIS

● : 7-685-648-79 +BVTP 3X12

Replace only with part number  
specified.

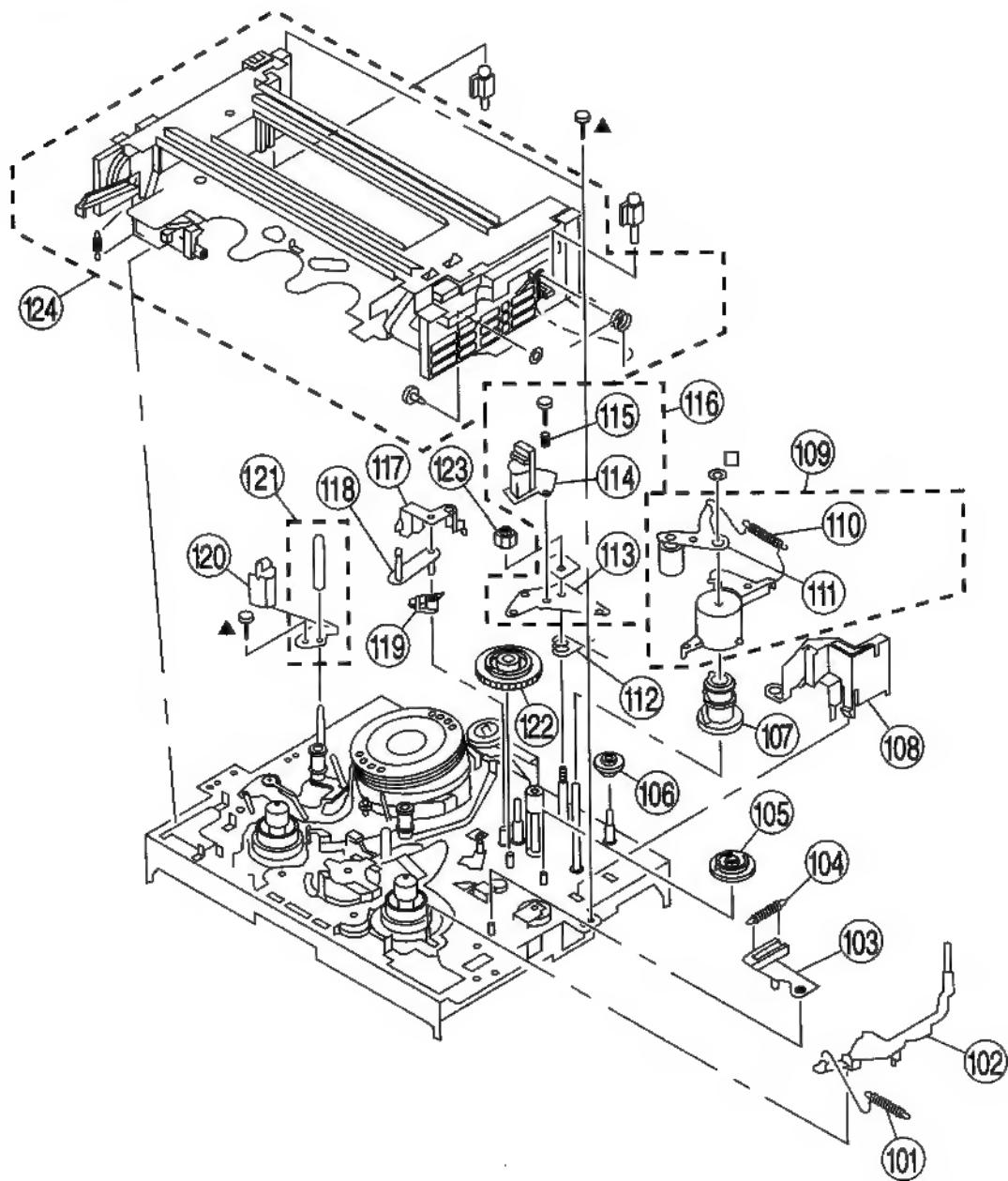
Ne les remplacer que par une  
pièce portant le numéro spécifié.



### 5-3. MECHANICAL DECK ASSEMBLY 1

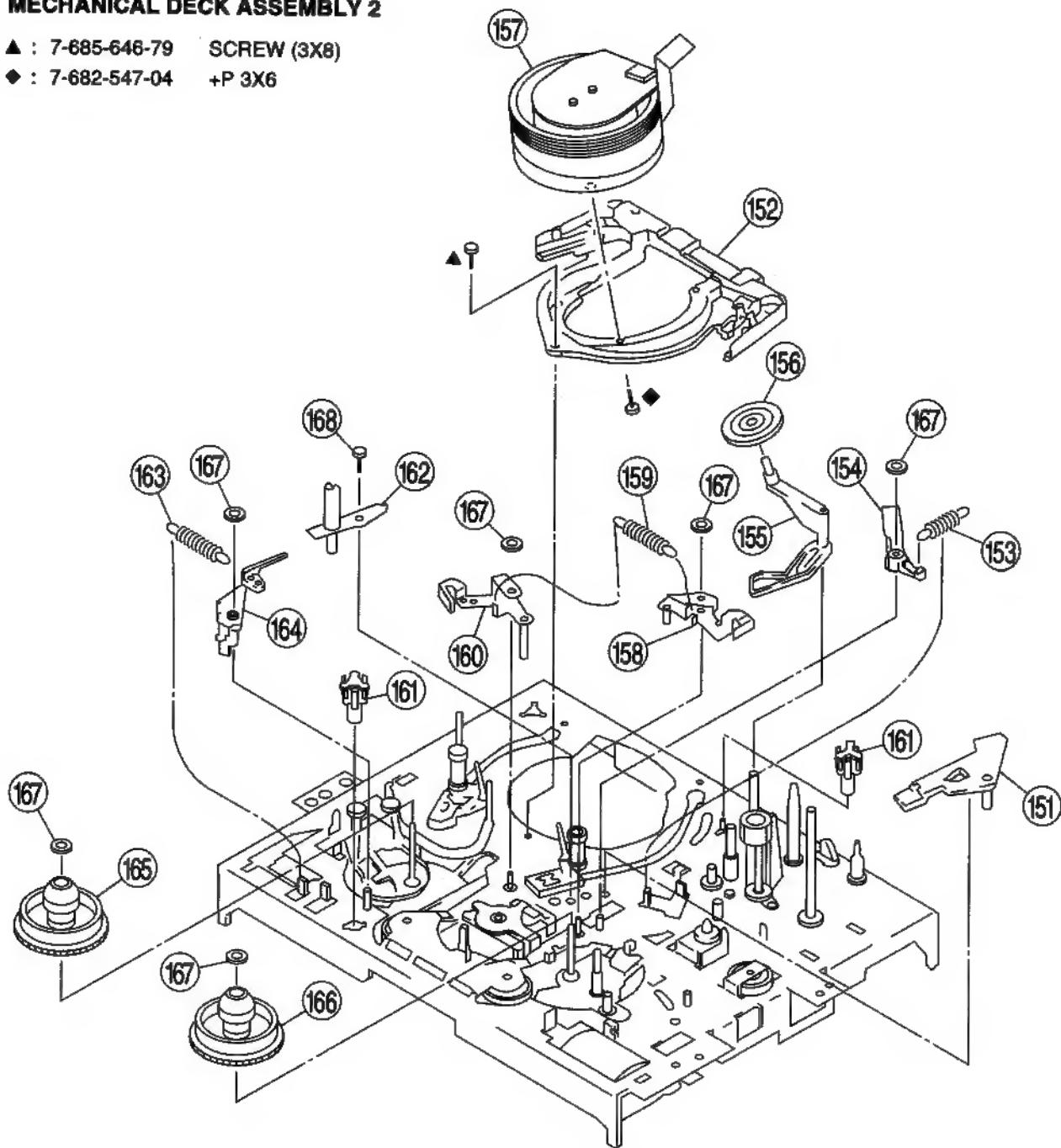
□ : 7-624-106-04 STOP RING 3.0, TYPE-E

▲ : 7-685-646-79 SCREW (3X8)



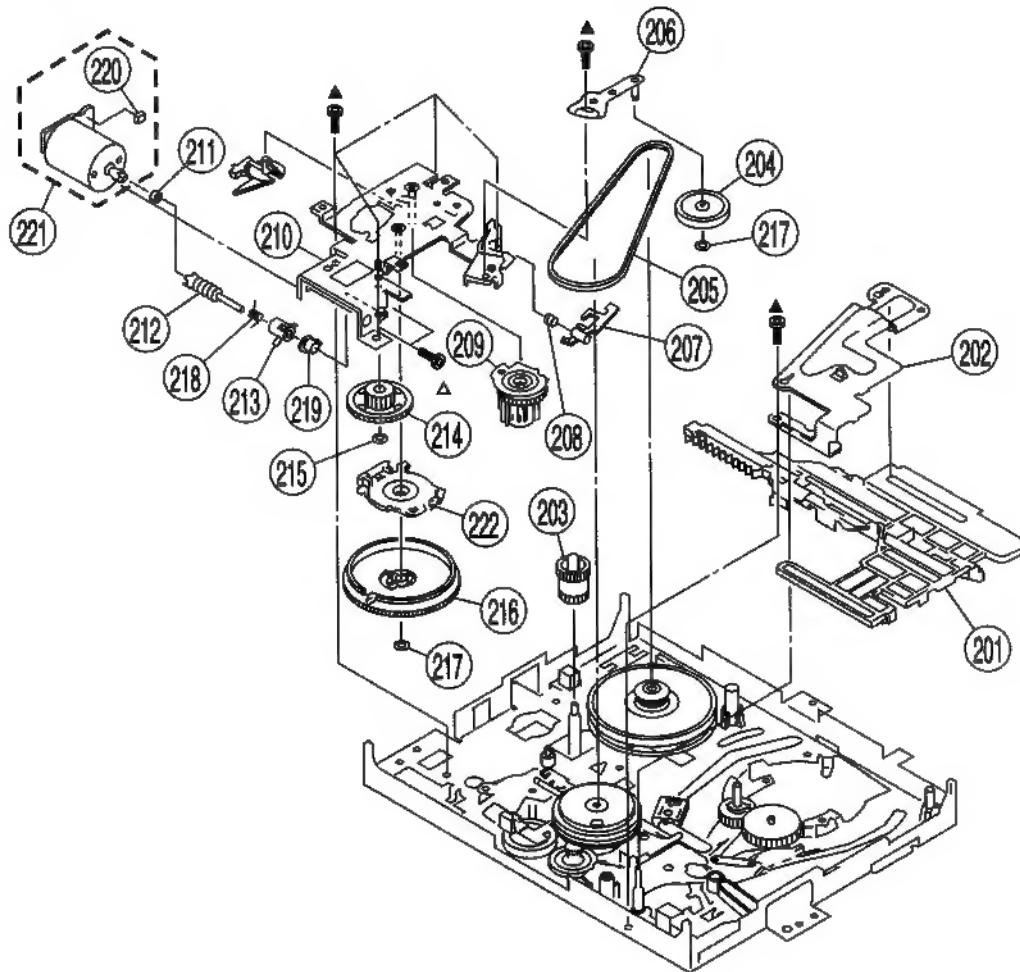
## 5-4. MECHANICAL DECK ASSEMBLY 2

▲ : 7-685-646-79 SCREW (3X8)  
◆ : 7-682-547-04 +P 3X6



## 5-5. MECHANICAL DECK ASSEMBLY 3

△ : 7-682-645-01 +PS 3X8  
▲ : 7-685-646-79 SCREW (3X8)



## 5-6. MECHANICAL DECK ASSEMBLY 4

